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OPTICAL CONSTANTS OF MINERALS  
AND OTHER MATERIALS  
FROM THE MILLIMETER TO THE ULTRAVIOLET

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by Marvin R. Querry, Ph.D.

UNIVERSITY OF MISSOURI-KANSAS CITY  
Kansas City, MO 64110

November 1987

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) Reflectance spectra of near normal incidence and/or transmittance spectra of 29 materials were acquired in the ultraviolet, visible, and infrared spectra regions. Optical constants of the materials were determined primarily by use of Kramers-Kronig analysis of reflectance or extinction coefficient spectra. The 29 materials were:					
1. Sodium chloride		9. Manganese		17. Montmorillonite	
2. Potassium chloride		10. Molybdenum		18. Kaolin	
3. Cesium iodide		11. Zirconium		19. Illite	
4. Cesium bromide		12. Anhydrite (E//X)		20. Composite of clays	
5. Zinc sulfide		13. Anhydrite (E//Y)		21. Lanthanum hexaboride	
6. Zinc selenide		14. Anhydrite (E//Z)		22. Diesel soot (UMKC)	
7. Barium fluoride		15. Dolomite (E//C)		23. Diesel soot (NMSU unheated)	
8. Zinc		16. Dolomite (E+C)		(continued on reverse)	
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18. Subject Terms (continued)

NaCl	Zn	Clays
KCl	Mn	SF-96
CsI	Mo	DMMP
CsBr	Zr	DES
ZnS	Anhydrite	DIMP
ZnSe	Dolomite	DEP
BaF <sub>2</sub>		

19. Abstract (continued)

- 24. Diesel soot (NMSU heated)
  - 25. Polydimethylsiloxane (SF-96)
  - 26. Dimethyl methylphosphonate (DIMP)
  - 27. Diethyl sulfite (DES)
  - 28. Diisopropyl methyl phosphonate (DIMP)
  - 29. Diethylphthalate (DEP)
- sand*

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## PREFACE

The work described in this report was authorized under Contract No. DAAA15-85-K-0004. This work was started in June 1985 and completed in May 1987.

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OPTICAL CONSTANTS OF MINERALS AND  
OTHER MATERIALS FROM THE MILLIMETER  
TO THE ULTRAVIOLET

1. STATEMENT OF OBJECTIVE

The objective for the University of Missouri-Kansas City portion of this contract was

to determine optical constants in the 0.2-55.5  $\mu$ m wavelength region on a variety of hitherto uncharacterized smoke materials including (but not limited to) metals, crystalline materials, and liquids.

Professor R.J. Bell and R.W. Alexander at the University of Missouri-Rolla are reporting separately on the optical constants of smoke materials in the 50-10,000  $\mu$ m wavelength region.

2. CONCLUSION

We prepared samples for 24 materials, measured 28 reflectance spectra of the materials, measured at least 40 transmittance spectra for 6 of the materials, used Kramers-Kronig analysis as the primary means to determine spectral values of the complex refractive indices  $n+ik$  from 27 of the reflectance spectra and 5 extinction coefficient spectra, and herein present the measurements and spectral values of  $n+ik$  in graphical and tabular form. Data files more complete than those in the tabulations presented here were sent electronically via Bitnet-ARPAnet to the Contracting Officer's Technical Representative, Mr. Merrill E. Milham, CRDEC.

### 3. MATERIALS INVESTIGATED

Twenty-four (24) materials were investigated which comprised 29 samples, e.g. an optically biaxial crystal such as anhydrite is one material but was considered to be three samples because three separate spectra are required to optically characterize anhydrite. The 29 samples were

1. Sodium Chloride (NaCl)
2. Potassium Chloride (KCl)
3. Cesium Iodide (CsI)
4. Cesium Bromide (CsBr)
5. Barium Fluoride (BaF<sub>2</sub>)
6. Zinc Sulfide (ZnS)
7. Zinc Selenide (ZnSe)
8. Colloidal Montmorillonite
9. Colloidal Kaolin
10. Colloidal Illite
11. Composite Clay (Samples 8,9,10)
12. Diesel Soot made at UMKC
13. Diesel Soot from NMSU, unheated
14. Diesel Soot from NMSU, heated
15. Lanthanum Hexaboride Powder
16. Anhydrite (E para. X)
17. Anhydrite (E para. Y)
18. Anhydrite (E para. Z)
19. Dolomite (E para. C)

20. Dolomite (E perp. C)
21. Molybdenum
22. Zirconium
23. Manganese
24. Zinc
25. Polydimethylsiloxane Fluid (SF-96)
26. Dimethyl-methylphosphonate (DMP)
27. Diisopropyl-methylphosphonate (DIMP)
28. Diethylphthalate (DEP)
29. Diethyl sulfite (DES)

#### 4. OPTICAL PROPERTIES AND OPTICAL CONSTANTS

##### 4.1 Sodium Chloride (NaCl)

Sodium chloride is an optically isotropic cubic crystal with  $Fm\bar{3}m$  space group symmetry,  $Z=4$  molecular units/unit cell, and specific gravity of 2.168. The crystals used for the investigation were high purity 2.5 cm cubes obtained from Optovac Inc., E. Brookfield Rd., North Brookfield, MA 01535.

A sample for measurement of reflectance spectra was prepared as follows. A 63.4-26.6-90.0 degree right angle prism was cut from one of the cubes to eliminate the possibility of measuring radiant flux reflected from the back surface of the sample. The 2.5 cm square face of the prism, from which the reflectance was to be measured was polished on a water saturated Beuhler Microcloth, rinsed in carbon tetrachloride to remove the water from the surface, etched for about 1.5 hours in concentrated hydrochloric acid, rinsed again in carbon tetrachloride, dried, and transferred immediately to the dry-air atmosphere of one of the spectrometers for acquisition of reflectance spectra.

The reflectance at near normal incidence (6.5 deg) was measured relative to precalibrated first-surface aluminum mirrors. A Perkin-Elmer 580B and a Varian 2300 spectrophotometers were used to acquire the relative reflectance spectrum of the sample in the  $180-4,000\text{ cm}^{-1}$  wave-number and 200-2,500 nm wavelength regions, respectively. The reflectance spectrum of NaCl was then obtained by multiplying the relative reflectance spectrum



with the reflectance spectrum for the aluminum mirror. The resultant reflectance spectrum for NaCl is presented in Figures 1 and 2.

The complex refractive index  $n+ik$  for NaCl was determined by Kramers-Kronig methods. For this purpose the infrared reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $0\text{ cm}^{-1}$  by use of the data previously tabulated for NaCl by Eldridge and Pali.<sup>1</sup> Spectral values of  $n$  and  $k$  are presented graphically in Figures 1 and 2, and are tabulated in Table 1. There is no graph of the  $k$  spectrum in Figure 2 because in the 200-2,500 nm wavelength region  $k$  for NaCl is too small to be measured by use of reflectance methods.

# SODIUM CHLORIDE

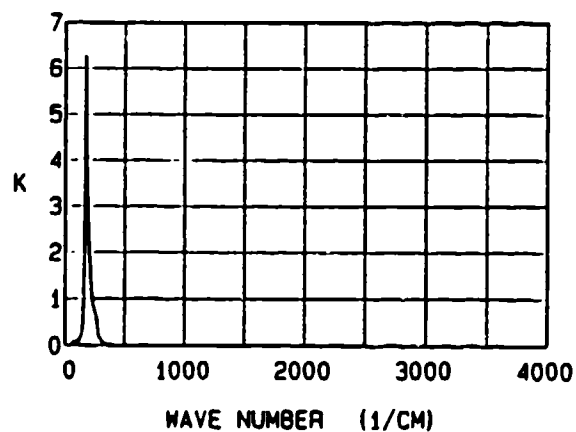
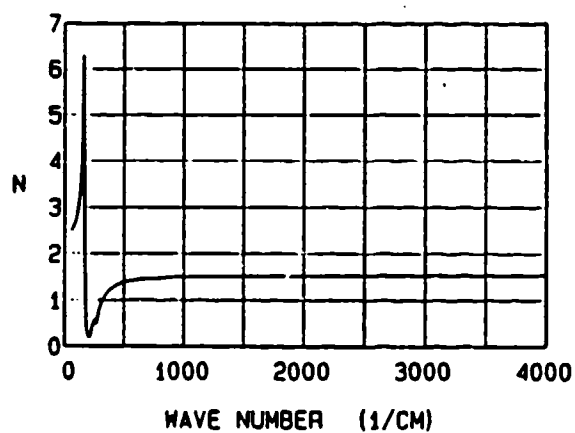
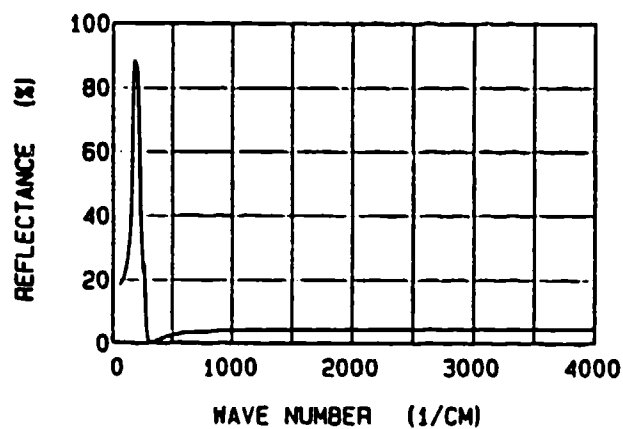


Figure 1. The Infrared ( $60\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K for sodium chloride.

# SODIUM CHLORIDE

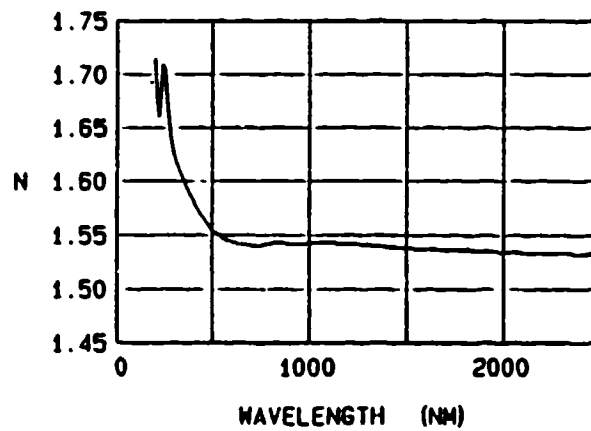
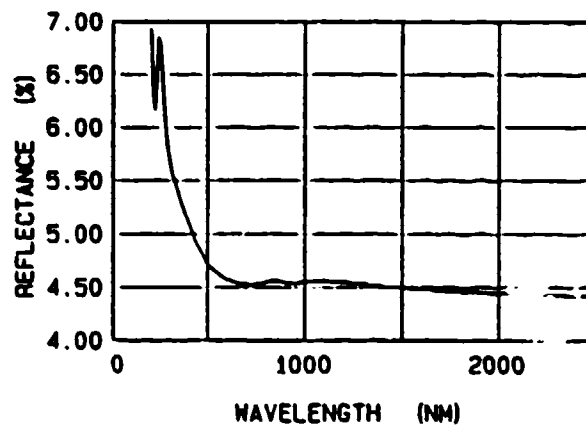


Figure 2. The uv-vis-nir (220-2,500 nm) reflectance and refractive index N for sodium chloride.

Table 1. Sodium Chloride (NaCl).

PAGE 1

WN	WL	N	K	DN	DK	R
60.00	166.6667	2.493	0.056	0.030	0.056	0.18295
80.00	125.0000	2.585	0.071	0.026	0.071	0.19575
100.00	100.0000	2.756	0.077	0.029	0.077	0.21890
120.00	83.3333	3.047	0.095	0.034	0.095	0.25620
140.00	71.4286	3.662	0.226	0.059	0.226	0.32765
160.00	62.5000	6.293	1.948	0.516	0.684	0.55825
180.00	55.5556	0.431	3.582	0.064	0.286	0.88410
200.00	50.0000	0.192	1.970	0.016	0.109	0.85490
220.00	45.4545	0.265	1.147	0.013	0.056	0.63670
240.00	41.6667	0.497	0.792	0.016	0.038	0.30700
260.00	38.4615	0.480	0.617	0.014	0.033	0.25350
280.00	35.7143	0.677	0.172	0.011	0.015	0.04695
300.00	33.3333	0.866	0.102	0.012	0.010	0.00815
320.00	31.2500	1.001	0.049	0.002	0.042	0.00060
340.00	29.4118	1.093	0.031	0.024	0.010	0.00220
360.00	27.7778	1.171	0.011	0.017	0.008	0.00620
380.00	26.3158	1.226	0.014	0.015	0.010	0.01035
400.00	25.0000	1.263	0.003	0.014	0.003	0.01355
420.00	23.8095	1.302	0.003	0.014	0.003	0.01725
440.00	22.7273	1.330	0.002	0.013	0.002	0.02005
460.00	21.7391	1.352	0.003	0.013	0.003	0.02240
480.00	20.8333	1.371	0.004	0.013	0.004	0.02445
500.00	20.0000	1.386	0.005	0.013	0.005	0.02620
520.00	19.2308	1.396	0.006	0.013	0.006	0.02730
540.00	18.5185	1.406	0.003	0.013	0.003	0.02845
560.00	17.8571	1.417	0.001	0.013	0.001	0.02975
580.00	17.2414	1.428	0.000	0.013	0.000	0.03105
600.00	16.6667	1.435	0.000	0.013	0.000	0.03190
620.00	16.1290	1.441	0.000	0.013	0.000	0.03265
640.00	15.6250	1.446	0.000	0.013	0.000	0.03330
660.00	15.1515	1.451	0.000	0.013	0.000	0.03385
680.00	14.7059	1.455	0.000	0.013	0.000	0.03440
700.00	14.2857	1.460	0.000	0.013	0.000	0.03495
720.00	13.8889	1.464	0.000	0.013	0.000	0.03540
740.00	13.5135	1.468	0.000	0.013	0.000	0.03590
760.00	13.1579	1.471	0.000	0.013	0.000	0.03635
780.00	12.8205	1.474	0.000	0.013	0.000	0.03675
800.00	12.5000	1.478	0.000	0.013	0.000	0.03715
820.00	12.1951	1.480	0.000	0.013	0.000	0.03750
840.00	11.9048	1.483	0.000	0.013	0.000	0.03785
860.00	11.6279	1.486	0.000	0.013	0.000	0.03815
880.00	11.3636	1.488	0.000	0.013	0.000	0.03845
900.00	11.1111	1.490	0.000	0.013	0.000	0.03875
920.00	10.8696	1.493	0.000	0.013	0.000	0.03905
940.00	10.6383	1.495	0.000	0.013	0.000	0.03930
960.00	10.4167	1.497	0.000	0.013	0.000	0.03955
980.00	10.2041	1.498	0.000	0.013	0.000	0.03975
1000.00	10.0000	1.500	0.000	0.013	0.000	0.03995
1020.00	9.8039	1.501	0.000	0.013	0.000	0.04015
1040.00	9.6154	1.503	0.000	0.013	0.000	0.04035

Table 1. Sodium Chloride (NaCl).

PAGE 2

WN	WL	N	K	DN	DK	R
1060.00	9.4340	1.504	0.000	0.013	0.000	0.04050
1080.00	9.2593	1.505	0.000	0.013	0.000	0.04065
1100.00	9.0909	1.506	0.000	0.013	0.000	0.04075
1120.00	8.9286	1.507	0.000	0.013	0.000	0.04090
1140.00	8.7719	1.508	0.000	0.013	0.000	0.04100
1160.00	8.6207	1.509	0.000	0.013	0.000	0.04110
1180.00	8.4746	1.509	0.000	0.013	0.000	0.04115
1200.00	8.3333	1.510	0.000	0.013	0.000	0.04125
1220.00	8.1967	1.510	0.000	0.013	0.000	0.04130
1240.00	8.0645	1.511	0.000	0.013	0.000	0.04140
1260.00	7.9365	1.511	0.000	0.013	0.000	0.04145
1280.00	7.8125	1.512	0.000	0.013	0.000	0.04150
1300.00	7.6923	1.512	0.000	0.013	0.000	0.04160
1320.00	7.5758	1.513	0.000	0.013	0.000	0.04165
1340.00	7.4627	1.513	0.000	0.013	0.000	0.04170
1360.00	7.3529	1.514	0.000	0.013	0.000	0.04175
1380.00	7.2464	1.514	0.000	0.013	0.000	0.04180
1400.00	7.1429	1.514	0.000	0.013	0.000	0.04185
1420.00	7.0423	1.515	0.000	0.013	0.000	0.04190
1440.00	6.9444	1.515	0.000	0.013	0.000	0.04195
1460.00	6.8493	1.516	0.000	0.013	0.000	0.04200
1480.00	6.7568	1.516	0.000	0.013	0.000	0.04200
1500.00	6.6667	1.516	0.000	0.013	0.000	0.04205
1520.00	6.5789	1.516	0.000	0.013	0.000	0.04210
1540.00	6.4935	1.517	0.000	0.013	0.000	0.04215
1560.00	6.4103	1.517	0.000	0.013	0.000	0.04220
1580.00	6.3291	1.517	0.000	0.013	0.000	0.04220
1600.00	6.2500	1.518	0.000	0.013	0.000	0.04225
1620.00	6.1728	1.518	0.000	0.013	0.000	0.04230
1640.00	6.0976	1.518	0.000	0.013	0.000	0.04235
1660.00	6.0241	1.519	0.000	0.013	0.000	0.04240
1680.00	5.9524	1.519	0.000	0.013	0.000	0.04240
1700.00	5.8824	1.519	0.000	0.013	0.000	0.04245
1720.00	5.8140	1.519	0.000	0.013	0.000	0.04250
1740.00	5.7471	1.520	0.000	0.013	0.000	0.04255
1760.00	5.6818	1.520	0.000	0.013	0.000	0.04255
1780.00	5.6180	1.520	0.000	0.013	0.000	0.04260
1800.00	5.5556	1.521	0.000	0.013	0.000	0.04265
1820.00	5.4945	1.521	0.000	0.013	0.000	0.04270
1840.00	5.4348	1.521	0.000	0.013	0.000	0.04270
1860.00	5.3763	1.521	0.000	0.013	0.000	0.04275
1880.00	5.3191	1.522	0.000	0.013	0.000	0.04280
1900.00	5.2632	1.522	0.000	0.013	0.000	0.04285
1920.00	5.2083	1.522	0.000	0.013	0.000	0.04285
1940.00	5.1546	1.523	0.000	0.013	0.000	0.04290
1960.00	5.1020	1.523	0.000	0.013	0.000	0.04295
1980.00	5.0505	1.523	0.000	0.013	0.000	0.04300
2000.00	5.0000	1.524	0.000	0.013	0.000	0.04305
2020.00	4.9505	1.524	0.000	0.013	0.000	0.04305
2040.00	4.9020	1.524	0.000	0.013	0.000	0.04310

Table 1. Sodium Chloride (NaCl).

PAGE 3

WN	WL	L	K	DN	DK	R
2060.00	4.8544	1.524	0.000	0.013	0.000	0.04315
2080.00	4.8077	1.525	0.000	0.013	0.000	0.04320
2100.00	4.7619	1.525	0.000	0.013	0.000	0.04325
2120.00	4.7170	1.525	0.000	0.013	0.000	0.04325
2140.00	4.6729	1.526	0.000	0.013	0.000	0.04330
2160.00	4.6296	1.526	0.000	0.013	0.000	0.04335
2180.00	4.5872	1.526	0.000	0.013	0.000	0.04340
2200.00	4.5455	1.526	0.000	0.013	0.000	0.04340
2220.00	4.5045	1.527	0.000	0.013	0.000	0.04345
2240.00	4.4643	1.527	0.000	0.013	0.000	0.04350
2260.00	4.4248	1.527	0.000	0.013	0.000	0.04350
2280.00	4.3860	1.527	0.000	0.013	0.000	0.04355
2300.00	4.3478	1.527	0.000	0.013	0.000	0.04355
2320.00	4.3103	1.528	0.000	0.013	0.000	0.04360
2340.00	4.2735	1.528	0.000	0.013	0.000	0.04360
2360.00	4.2373	1.528	0.000	0.013	0.000	0.04365
2380.00	4.2017	1.528	0.000	0.013	0.000	0.04365
2400.00	4.1667	1.529	0.000	0.013	0.000	0.04370
2420.00	4.1322	1.529	0.000	0.013	0.000	0.04370
2440.00	4.0984	1.529	0.000	0.013	0.000	0.04370
2460.00	4.0650	1.529	0.000	0.013	0.000	0.04375
2480.00	4.0323	1.529	0.000	0.013	0.000	0.04375
2500.00	4.0000	1.529	0.000	0.013	0.000	0.04375
2520.00	3.9683	1.529	0.000	0.013	0.000	0.04380
2540.00	3.9370	1.529	0.000	0.013	0.000	0.04380
2560.00	3.9063	1.529	0.000	0.013	0.000	0.04380
2580.00	3.8760	1.529	0.000	0.013	0.000	0.04380
2600.00	3.8462	1.529	0.000	0.013	0.000	0.04380
2620.00	3.8168	1.530	0.000	0.013	0.000	0.04385
2640.00	3.7879	1.530	0.000	0.013	0.000	0.04385
2660.00	3.7594	1.530	0.000	0.013	0.000	0.04385
2680.00	3.7313	1.530	0.000	0.013	0.000	0.04385
2700.00	3.7037	1.530	0.000	0.013	0.000	0.04385
2720.00	3.6765	1.530	0.000	0.013	0.000	0.04385
2740.00	3.6496	1.530	0.000	0.013	0.000	0.04390
2760.00	3.6232	1.530	0.000	0.013	0.000	0.04390
2780.00	3.5971	1.530	0.000	0.013	0.000	0.04390
2800.00	3.5714	1.531	0.000	0.013	0.000	0.04395
2820.00	3.5461	1.531	0.000	0.013	0.000	0.04395
2840.00	3.5211	1.531	0.000	0.013	0.000	0.04400
2860.00	3.4965	1.531	0.000	0.013	0.000	0.04400
2880.00	3.4722	1.531	0.000	0.013	0.000	0.04405
2900.00	3.4483	1.531	0.000	0.013	0.000	0.04405
2920.00	3.4247	1.532	0.000	0.013	0.000	0.04410
2940.00	3.4014	1.532	0.000	0.013	0.000	0.04410
2960.00	3.3784	1.532	0.000	0.013	0.000	0.04415
2980.00	3.3557	1.532	0.000	0.013	0.000	0.04415
3000.00	3.3333	1.532	0.000	0.013	0.000	0.04420
3020.00	3.3113	1.532	0.000	0.013	0.000	0.04420
3040.00	3.2895	1.533	0.000	0.013	0.000	0.04425

Table 1. Sodium Chloride (NaCl).

PAGE 4

WN	WL	N	K	DN	DK	R
3060.00	3.2680	1.533	0.000	0.013	0.000	0.04425
3080.00	3.2468	1.533	0.000	0.013	0.000	0.04425
3100.00	3.2258	1.533	0.000	0.013	0.000	0.04430
3120.00	3.2051	1.533	0.000	0.013	0.000	0.04430
3140.00	3.1847	1.534	0.000	0.013	0.000	0.04435
3160.00	3.1646	1.534	0.000	0.013	0.000	0.04435
3180.00	3.1447	1.534	0.000	0.013	0.000	0.04435
3200.00	3.1250	1.534	0.000	0.013	0.000	0.04435
3220.00	3.1050	1.534	0.000	0.013	0.000	0.04435
3240.00	3.0864	1.534	0.000	0.013	0.000	0.04440
3260.00	3.0675	1.534	0.000	0.013	0.000	0.04440
3280.00	3.0488	1.534	0.000	0.013	0.000	0.04440
3300.00	3.0303	1.534	0.000	0.013	0.000	0.04440
3320.00	3.0120	1.534	0.000	0.013	0.000	0.04445
3340.00	2.9940	1.534	0.000	0.013	0.000	0.04445
3360.00	2.9762	1.534	0.000	0.013	0.000	0.04445
3380.00	2.9586	1.534	0.000	0.013	0.000	0.04445
3400.00	2.9412	1.534	0.000	0.013	0.000	0.04445
3420.00	2.9240	1.534	0.000	0.013	0.000	0.04445
3440.00	2.9070	1.534	0.000	0.013	0.000	0.04445
3460.00	2.8902	1.534	0.000	0.013	0.000	0.04440
3480.00	2.8736	1.534	0.000	0.013	0.000	0.04440
3500.00	2.8571	1.534	0.000	0.013	0.000	0.04440
3520.00	2.8409	1.534	0.000	0.013	0.000	0.04440
3540.00	2.8249	1.534	0.000	0.013	0.000	0.04435
3560.00	2.8090	1.534	0.000	0.013	0.000	0.04435
3580.00	2.7933	1.534	0.000	0.013	0.000	0.04435
3600.00	2.7778	1.534	0.000	0.013	0.000	0.04435
3620.00	2.7624	1.533	0.000	0.013	0.000	0.04430
3640.00	2.7473	1.533	0.000	0.013	0.000	0.04430
3660.00	2.7322	1.533	0.000	0.013	0.000	0.04430
3680.00	2.7174	1.533	0.000	0.013	0.000	0.04425
3700.00	2.7027	1.533	0.000	0.013	0.000	0.04425
3720.00	2.6882	1.533	0.000	0.013	0.000	0.04425
3740.00	2.6738	1.533	0.000	0.013	0.000	0.04425
3760.00	2.6596	1.533	0.000	0.013	0.000	0.04425
3780.00	2.6455	1.533	0.000	0.013	0.000	0.04425
3800.00	2.6316	1.533	0.000	0.013	0.000	0.04425
3820.00	2.6178	1.533	0.000	0.013	0.000	0.04425
3840.00	2.6042	1.533	0.000	0.013	0.000	0.04425
3860.00	2.5907	1.533	0.000	0.013	0.000	0.04425
3880.00	2.5773	1.533	0.000	0.013	0.000	0.04425
3900.00	2.5641	1.533	0.000	0.013	0.000	0.04425
3920.00	2.5510	1.533	0.000	0.013	0.000	0.04425
3940.00	2.5381	1.533	0.000	0.013	0.000	0.04425
3960.00	2.5253	1.533	0.000	0.013	0.000	0.04425
3980.00	2.5126	1.533	0.000	0.013	0.000	0.04425
4000.00	2.5000	1.533	0.000	0.013	0.000	0.04425
4032.26	2.4800	1.532	0.000	0.013	0.000	0.04420
4065.04	2.4600	1.532	0.000	0.013	0.000	0.04420

Table 1. Sodium Chloride (NaCl).

PAGE 5

WN	WL	N	K	DN	DK	R
4098.36	2.4400	1.532	0.000	0.013	0.000	0.04420
4132.23	2.4200	1.532	0.000	0.013	0.000	0.04420
4166.67	2.4000	1.532	0.000	0.013	0.000	0.04420
4201.68	2.3800	1.532	0.000	0.013	0.000	0.04420
4237.29	2.3600	1.532	0.000	0.013	0.000	0.04420
4273.50	2.3400	1.533	0.000	0.013	0.000	0.04425
4310.35	2.3200	1.533	0.000	0.013	0.000	0.04425
4347.83	2.3000	1.533	0.000	0.013	0.000	0.04425
4385.96	2.2800	1.533	0.000	0.013	0.000	0.04425
4424.78	2.2600	1.533	0.000	0.013	0.000	0.04425
4464.29	2.2400	1.533	0.000	0.013	0.000	0.04425
4504.50	2.2200	1.533	0.000	0.013	0.000	0.04425
4545.45	2.2000	1.532	0.000	0.013	0.000	0.04420
4587.16	2.1800	1.533	0.000	0.013	0.000	0.04425
4629.63	2.1600	1.533	0.000	0.013	0.000	0.04425
4672.90	2.1400	1.533	0.000	0.013	0.000	0.04425
4716.98	2.1200	1.533	0.000	0.013	0.000	0.04430
4761.90	2.1000	1.534	0.000	0.013	0.000	0.04435
4807.69	2.0800	1.534	0.000	0.013	0.000	0.04435
4854.37	2.0600	1.534	0.000	0.013	0.000	0.04440
4901.96	2.0400	1.534	0.000	0.013	0.000	0.04445
4950.50	2.0200	1.534	0.000	0.013	0.000	0.04445
5000.00	2.0000	1.534	0.000	0.013	0.000	0.04445
5050.50	1.9800	1.534	0.000	0.013	0.000	0.04445
5102.04	1.9600	1.535	0.000	0.013	0.000	0.04450
5154.64	1.9400	1.535	0.000	0.013	0.000	0.04450
5208.33	1.9200	1.535	0.000	0.013	0.000	0.04450
5263.16	1.9000	1.535	0.000	0.013	0.000	0.04450
5319.15	1.8800	1.535	0.000	0.013	0.000	0.04455
5376.34	1.8600	1.535	0.000	0.013	0.000	0.04455
5434.78	1.8400	1.536	0.000	0.013	0.000	0.04460
5494.50	1.8200	1.536	0.000	0.013	0.000	0.04460
5555.56	1.8000	1.536	0.000	0.013	0.000	0.04460
5617.98	1.7800	1.536	0.000	0.013	0.000	0.04460
5681.82	1.7600	1.536	0.000	0.013	0.000	0.04460
5747.13	1.7400	1.536	0.000	0.013	0.000	0.04465
5813.95	1.7200	1.536	0.000	0.013	0.000	0.04465
5882.35	1.7000	1.536	0.000	0.013	0.000	0.04470
5952.38	1.6800	1.536	0.000	0.013	0.000	0.04470
6024.10	1.6600	1.537	0.000	0.013	0.000	0.04475
6097.56	1.6400	1.537	0.000	0.013	0.000	0.04475
6172.84	1.6200	1.537	0.000	0.013	0.000	0.04480
6250.00	1.6000	1.537	0.000	0.013	0.000	0.04480
6329.11	1.5800	1.537	0.000	0.013	0.000	0.04485
6410.26	1.5600	1.537	0.000	0.013	0.000	0.04485
6493.51	1.5400	1.537	0.000	0.013	0.000	0.04485
6578.95	1.5200	1.538	0.000	0.013	0.000	0.04490
6666.67	1.5000	1.538	0.000	0.013	0.000	0.04490
6756.76	1.4800	1.538	0.000	0.013	0.000	0.04495
6849.31	1.4600	1.538	0.000	0.013	0.000	0.04495



Table 1. Sodium Chloride (NaCl).

PAGE 6

WN	WL	N	K	DN	DK	R
6944.44	1.4400	1.539	0.000	0.013	0.000	0.04500
7042.25	1.4200	1.539	0.000	0.013	0.000	0.04500
7142.86	1.4000	1.539	0.000	0.013	0.000	0.04505
7246.38	1.3800	1.539	0.000	0.013	0.000	0.04510
7352.94	1.3600	1.540	0.000	0.013	0.000	0.04515
7462.69	1.3400	1.540	0.000	0.013	0.000	0.04515
7575.76	1.3200	1.540	0.000	0.013	0.000	0.04520
7692.31	1.3000	1.541	0.000	0.013	0.000	0.04530
7812.50	1.2800	1.541	0.000	0.013	0.000	0.04535
7936.51	1.2600	1.541	0.000	0.013	0.000	0.04535
8064.52	1.2400	1.542	0.000	0.013	0.000	0.04540
8196.72	1.2200	1.542	0.000	0.013	0.000	0.04545
8333.33	1.2000	1.542	0.000	0.013	0.000	0.04545
8474.58	1.1800	1.542	0.000	0.013	0.000	0.04550
8620.69	1.1600	1.542	0.000	0.013	0.000	0.04550
8771.93	1.1400	1.542	0.000	0.013	0.000	0.04550
8928.57	1.1200	1.543	0.000	0.013	0.000	0.04555
9090.91	1.1000	1.543	0.000	0.013	0.000	0.04560
9259.26	1.0800	1.543	0.000	0.013	0.000	0.04560
9433.96	1.0600	1.543	0.000	0.013	0.000	0.04555
9615.38	1.0400	1.543	0.000	0.013	0.000	0.04555
9803.92	1.0200	1.543	0.000	0.013	0.000	0.04555
10000.00	1.0000	1.542	0.000	0.013	0.000	0.04550
10204.08	0.9800	1.542	0.000	0.013	0.000	0.04545
10416.67	0.9600	1.542	0.000	0.013	0.000	0.04540
10638.30	0.9400	1.542	0.000	0.013	0.000	0.04540
10869.56	0.9200	1.542	0.000	0.013	0.000	0.04540
11111.11	0.9000	1.542	0.000	0.013	0.000	0.04540
11363.64	0.8800	1.542	0.000	0.013	0.000	0.04550
11627.91	0.8600	1.543	0.000	0.013	0.000	0.04560
11904.76	0.8400	1.543	0.000	0.013	0.000	0.04560
12195.12	0.8200	1.543	0.000	0.013	0.000	0.04555
12500.00	0.8000	1.542	0.000	0.013	0.000	0.04545
12820.51	0.7800	1.541	0.000	0.013	0.000	0.04535
13157.89	0.7600	1.541	0.000	0.013	0.000	0.04530
13513.51	0.7400	1.540	0.000	0.013	0.000	0.04525
13886.89	0.7200	1.540	0.000	0.013	0.000	0.04520
14285.71	0.7000	1.540	0.000	0.013	0.000	0.04525
14705.88	0.6800	1.541	0.000	0.013	0.000	0.04530
15151.51	0.6600	1.542	0.000	0.013	0.000	0.04540
15625.00	0.6400	1.542	0.000	0.013	0.000	0.04545
16129.03	0.6200	1.543	0.000	0.013	0.000	0.04560
16666.67	0.6000	1.544	0.000	0.013	0.000	0.04570
17241.38	0.5800	1.545	0.000	0.013	0.000	0.04590
17857.14	0.5600	1.547	0.000	0.013	0.000	0.04615
18518.52	0.5400	1.550	0.000	0.013	0.000	0.04645
19230.77	0.5200	1.552	0.000	0.013	0.000	0.04675
20000.00	0.5000	1.554	0.000	0.013	0.000	0.04710
20833.33	0.4800	1.559	0.000	0.013	0.000	0.04775
21739.13	0.4600	1.564	0.000	0.013	0.000	0.04840

Table 1. Sodium Chloride (NaCl).

PAGE 7

WN	WL	N	K	DN	DK	R
22727.27	0.4400	1.569	0.000	0.013	0.000	0.04905
23809.52	0.4200	1.575	0.000	0.014	0.000	0.04990
25000.00	0.4000	1.583	0.000	0.014	0.000	0.05090
26315.79	0.3800	1.589	0.000	0.014	0.000	0.05180
27777.78	0.3600	1.596	0.000	0.014	0.000	0.05275
29411.76	0.3400	1.606	0.000	0.014	0.000	0.05400
31250.00	0.3200	1.614	0.000	0.014	0.000	0.05510
33333.33	0.3000	1.625	0.000	0.014	0.000	0.05670
35714.29	0.2800	1.644	0.000	0.014	0.000	0.05935
38461.54	0.2600	1.683	0.000	0.014	0.000	0.06475
41666.67	0.2400	1.709	0.000	0.014	0.000	0.06845
45454.55	0.2200	1.660	0.000	0.014	0.000	0.06160

#### 4.2 Potassium Chloride (KCl).

Potassium chloride is an optically isotropic cubic crystal with  $Fm\bar{3}m$  space group symmetry,  $Z=4$  molecular units/unit cell, and specific gravity of 1.99. The crystals used for this investigation were high purity 2.5 cm cubes obtained from Optovac Inc., North Brookfield, Ma.

A sample for measurement of reflectance spectra was prepared as follows. A 63.4-26.6-90 degree right angle prism was cut from one of the cubes to eliminate the possibility of measuring radiant flux reflected from the back surface of the sample. The 2.5 cm square face of the prism, from which the near normal incidence reflectance was to be measured, was polished briefly on a water dampened lap, rinsed in carbon tetrachloride, etched for about 15 sec in concentrated hydrochloric acid, rinsed again with carbon tetrachloride, dried, and transferred immediately to the dry-air atmosphere of one of the spectrometers for acquisition of reflectance spectra.

Near normal incidence (6.5 deg) reflectance spectra were acquired relative to precalibrated first surface aluminum mirrors. A Perkin-Elmer 580B and Varian 2300 spectrophotometers were used to acquire the relative reflectance spectrum of the sample in the 180-4,000  $\text{cm}^{-1}$  wave-number and 200-2,500 nm wavelength regions, respectively. The reflectance of KCl was then obtained by multiplying the relative reflectance with the

reflectance spectrum of the aluminum mirror. The resultant reflectance spectrum for KCl is presented in Figures 3 and 4.

The complex refractive index  $n+ik$  for NaCl was determined by Kramers-Kronig methods. For this purpose the infrared reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $0\text{ cm}^{-1}$  by use of data previously tabulated for KCl by E.D. Palik.<sup>2</sup> Spectral values of  $n$  and  $k$  are presented graphically in Figures 3 and 4, and are tabulated in Table 2. There is no graph of the  $k$  spectrum in Figure 4 because in the 200-2,500 nm wavelength region  $k$  for KCl is too small to be measured by use of reflectance methods.

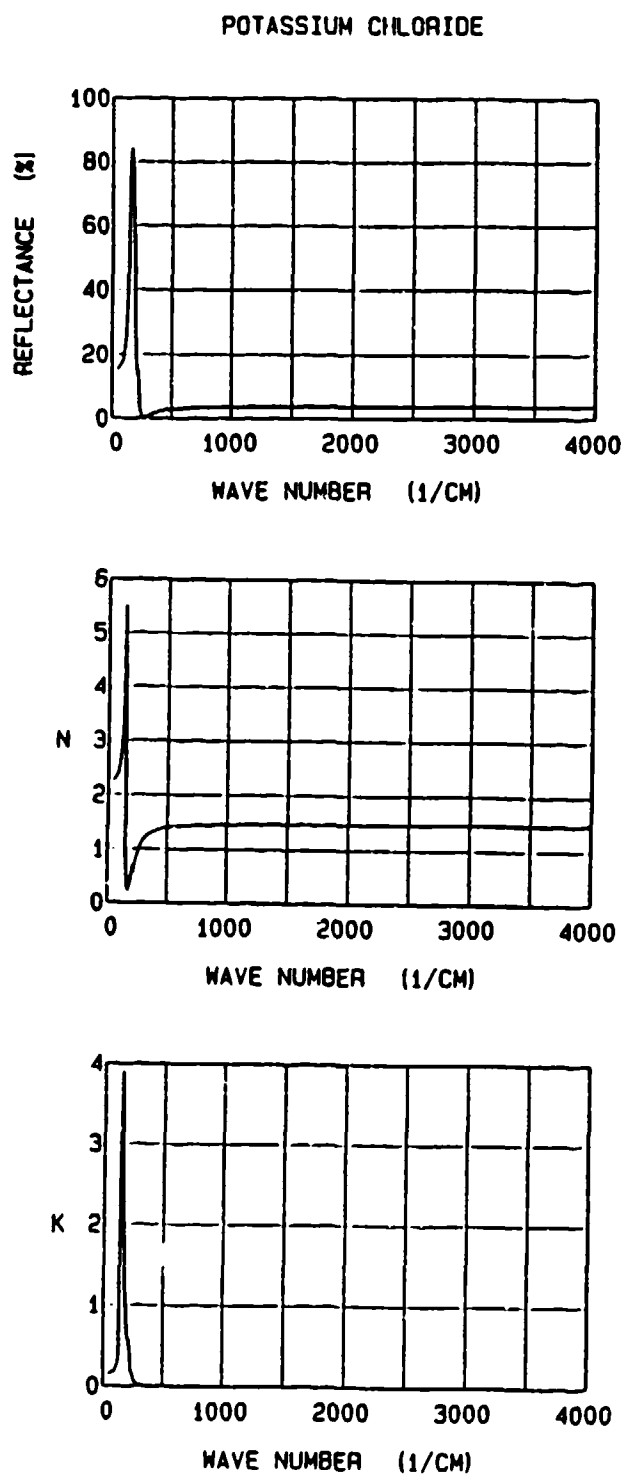


Figure 3. The infrared ( $60\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for potassium chloride.

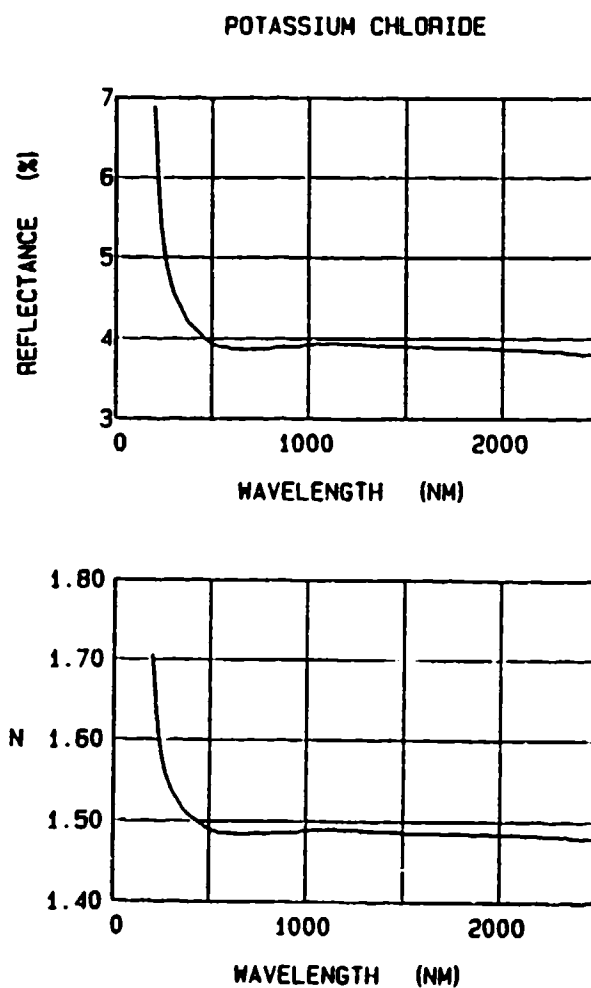


Figure 4. The uv-vis-nir (220-2,500 nm) reflectance and refractive index  $N$  for potassium chloride .

Table 2. Potassium Chloride (KCl).

PAGE 1

WN	WL	N	K	DN	DK	R
60.00	166.6667	2.290	0.154	0.014	0.041	0.15740
80.00	125.0000	2.360	0.173	0.015	0.044	0.16780
100.00	100.0000	2.561	0.186	0.016	0.053	0.19625
120.00	83.3333	3.010	0.249	0.022	0.077	0.25630
140.00	71.4286	5.500	3.337	0.353	0.186	0.58990
160.00	62.5000	0.303	2.425	0.016	0.064	0.84120
180.00	55.5556	0.311	1.149	0.008	0.021	0.59395
200.00	50.0000	0.566	0.569	0.007	0.010	0.18895
220.00	45.4545	0.553	0.411	0.006	0.009	0.14715
240.00	41.6667	0.843	0.162	0.008	0.007	0.01535
260.00	38.4615	0.979	0.067	0.010	0.026	0.00130
280.00	35.7143	1.093	0.023	0.023	0.008	0.00215
300.00	33.3333	1.174	0.013	0.015	0.005	0.00655
320.00	31.2500	1.229	0.008	0.012	0.005	0.01080
340.00	29.4118	1.269	0.009	0.011	0.006	0.01440
360.00	27.7778	1.297	0.010	0.010	0.007	0.01705
380.00	26.3158	1.318	0.007	0.010	0.007	0.01920
400.00	25.0000	1.338	0.005	0.010	0.005	0.02135
420.00	23.8095	1.354	0.006	0.009	0.006	0.02305
440.00	22.7273	1.367	0.005	0.009	0.005	0.02450
460.00	21.7391	1.378	0.006	0.009	0.006	0.02580
480.00	20.8333	1.386	0.005	0.009	0.005	0.02665
500.00	20.0000	1.396	0.003	0.009	0.003	0.02780
520.00	19.2308	1.404	0.004	0.009	0.004	0.02880
540.00	18.5185	1.411	0.006	0.009	0.006	0.02955
560.00	17.8571	1.415	0.006	0.009	0.006	0.03005
580.00	17.2414	1.420	0.006	0.009	0.006	0.03070
600.00	16.6667	1.424	0.008	0.009	0.008	0.03120
620.00	16.1290	1.427	0.008	0.009	0.008	0.03155
640.00	15.6250	1.430	0.008	0.009	0.008	0.03190
660.00	15.1515	1.433	0.008	0.009	0.008	0.03220
680.00	14.7059	1.435	0.008	0.009	0.008	0.03245
700.00	14.2857	1.437	0.008	0.008	0.008	0.03270
720.00	13.8889	1.439	0.008	0.008	0.008	0.03295
740.00	13.5135	1.440	0.007	0.008	0.007	0.03315
760.00	13.1579	1.442	0.007	0.008	0.007	0.03335
780.00	12.8205	1.444	0.006	0.008	0.006	0.03355
800.00	12.5000	1.445	0.006	0.008	0.006	0.03375
820.00	12.1951	1.447	0.006	0.008	0.006	0.03395
840.00	11.9048	1.448	0.005	0.008	0.005	0.03410
860.00	11.6279	1.450	0.005	0.008	0.005	0.03430
880.00	11.3636	1.451	0.004	0.008	0.004	0.03450
900.00	11.1111	1.453	0.004	0.008	0.004	0.03470
920.00	10.8696	1.454	0.005	0.008	0.005	0.03490
940.00	10.6383	1.455	0.005	0.008	0.005	0.03500
960.00	10.4167	1.456	0.004	0.008	0.004	0.03515
980.00	10.2041	1.457	0.005	0.008	0.005	0.03525
1000.00	10.0000	1.458	0.005	0.008	0.005	0.03535
1020.00	9.8039	1.458	0.005	0.008	0.005	0.03540
1040.00	9.6154	1.459	0.005	0.008	0.005	0.03550

Table 2. Potassium Chloride (KCl).

PAGE 2

WN	WL	N	K	DN	DK	R
1060.00	9.4340	1.460	0.005	0.008	0.005	0.03560
1080.00	9.2593	1.460	0.005	0.008	0.005	0.03565
1100.00	9.0909	1.461	0.005	0.008	0.005	0.03575
1120.00	8.9286	1.462	0.005	0.008	0.005	0.03580
1140.00	8.7719	1.462	0.005	0.008	0.005	0.03585
1160.00	8.6207	1.463	0.005	0.008	0.005	0.03595
1180.00	8.4746	1.463	0.005	0.008	0.005	0.03600
1200.00	8.3333	1.464	0.005	0.008	0.005	0.03605
1220.00	8.1967	1.464	0.005	0.008	0.005	0.03610
1240.00	8.0645	1.464	0.005	0.008	0.005	0.03615
1260.00	7.9365	1.465	0.005	0.008	0.005	0.03620
1280.00	7.8125	1.465	0.005	0.008	0.005	0.03625
1300.00	7.6923	1.465	0.005	0.008	0.005	0.03625
1320.00	7.5758	1.466	0.005	0.008	0.005	0.03630
1340.00	7.4627	1.466	0.005	0.008	0.005	0.03635
1360.00	7.3529	1.466	0.005	0.008	0.005	0.03635
1380.00	7.2464	1.466	0.005	0.008	0.005	0.03640
1400.00	7.1429	1.466	0.005	0.008	0.005	0.03640
1420.00	7.0423	1.467	0.004	0.008	0.004	0.03645
1440.00	6.9444	1.467	0.005	0.008	0.005	0.03645
1460.00	6.8493	1.467	0.004	0.008	0.004	0.03650
1480.00	6.7568	1.467	0.004	0.008	0.004	0.03650
1500.00	6.6667	1.468	0.004	0.008	0.004	0.03655
1520.00	6.5789	1.468	0.004	0.008	0.004	0.03655
1540.00	6.4935	1.468	0.004	0.008	0.004	0.03660
1560.00	6.4103	1.468	0.004	0.008	0.004	0.03660
1580.00	6.3291	1.468	0.004	0.008	0.004	0.03660
1600.00	6.2500	1.468	0.003	0.008	0.003	0.03665
1620.00	6.1728	1.468	0.003	0.008	0.003	0.03665
1640.00	6.0976	1.469	0.003	0.008	0.003	0.03670
1660.00	6.0241	1.469	0.003	0.008	0.003	0.03670
1680.00	5.9524	1.469	0.003	0.008	0.003	0.03675
1700.00	5.8824	1.469	0.003	0.008	0.003	0.03675
1720.00	5.8140	1.469	0.003	0.008	0.003	0.03675
1740.00	5.7471	1.470	0.002	0.008	0.002	0.03680
1760.00	5.6818	1.470	0.003	0.008	0.003	0.03680
1780.00	5.6180	1.470	0.002	0.008	0.002	0.03685
1800.00	5.5556	1.470	0.002	0.008	0.002	0.03685
1820.00	5.4945	1.470	0.002	0.008	0.002	0.03690
1840.00	5.4348	1.470	0.002	0.008	0.002	0.03690
1860.00	5.3763	1.470	0.002	0.008	0.002	0.03690
1880.00	5.3191	1.471	0.001	0.008	0.001	0.03695
1900.00	5.2632	1.471	0.002	0.008	0.002	0.03695
1920.00	5.2083	1.471	0.001	0.008	0.001	0.03700
1940.00	5.1546	1.471	0.001	0.008	0.001	0.03700
1960.00	5.1020	1.472	0.001	0.008	0.001	0.03705
1980.00	5.0505	1.472	0.001	0.008	0.001	0.03705
2000.00	5.0000	1.472	0.001	0.008	0.001	0.03710
2020.00	4.9505	1.472	0.001	0.008	0.001	0.03710
2040.00	4.9020	1.472	0.001	0.008	0.001	0.03715



Table 2. Potassium Chloride (KCl).

PAGE 3

WN	WL	N	K	DN	DK	R
2060.00	4.8544	1.472	0.001	0.008	0.001	0.03715
2080.00	4.8077	1.472	0.001	0.008	0.001	0.03715
2100.00	4.7619	1.473	0.000	0.008	0.000	0.03720
2120.00	4.7170	1.473	0.001	0.008	0.001	0.03720
2140.00	4.6729	1.473	0.000	0.008	0.000	0.03725
2160.00	4.6296	1.473	0.001	0.008	0.001	0.03725
2180.00	4.5872	1.473	0.000	0.008	0.000	0.03725
2200.00	4.5455	1.474	0.000	0.008	0.000	0.03730
2220.00	4.5045	1.474	0.001	0.008	0.001	0.03730
2240.00	4.4643	1.474	0.000	0.008	0.000	0.03730
2260.00	4.4248	1.474	0.000	0.008	0.000	0.03735
2280.00	4.3860	1.474	0.000	0.008	0.000	0.03735
2300.00	4.3478	1.474	0.000	0.008	0.000	0.03735
2320.00	4.3103	1.474	0.000	0.008	0.000	0.03740
2340.00	4.2735	1.474	0.000	0.008	0.000	0.03740
2360.00	4.2373	1.474	0.000	0.008	0.000	0.03740
2380.00	4.2017	1.474	0.000	0.008	0.000	0.03740
2400.00	4.1667	1.474	0.000	0.008	0.000	0.03740
2420.00	4.1322	1.475	0.000	0.008	0.000	0.03745
2440.00	4.0984	1.475	0.000	0.008	0.000	0.03745
2460.00	4.0650	1.475	0.000	0.008	0.000	0.03745
2480.00	4.0323	1.475	0.000	0.008	0.000	0.03745
2500.00	4.0000	1.475	0.000	0.008	0.000	0.03745
2520.00	3.9683	1.475	0.000	0.008	0.000	0.03745
2540.00	3.9370	1.475	0.000	0.008	0.000	0.03745
2560.00	3.9063	1.475	0.000	0.008	0.000	0.03745
2580.00	3.8760	1.475	0.000	0.008	0.000	0.03750
2600.00	3.8462	1.475	0.000	0.008	0.000	0.03750
2620.00	3.8168	1.475	0.000	0.008	0.000	0.03750
2640.00	3.7879	1.475	0.000	0.008	0.000	0.03750
2660.00	3.7594	1.475	0.000	0.008	0.000	0.03750
2680.00	3.7313	1.475	0.000	0.008	0.000	0.03750
2700.00	3.7037	1.475	0.000	0.008	0.000	0.03750
2720.00	3.6765	1.475	0.000	0.008	0.000	0.03750
2740.00	3.6496	1.476	0.000	0.008	0.000	0.03755
2760.00	3.6232	1.476	0.000	0.008	0.000	0.03755
2780.00	3.5971	1.476	0.000	0.008	0.000	0.03755
2800.00	3.5714	1.476	0.000	0.008	0.000	0.03755
2820.00	3.5461	1.476	0.000	0.008	0.000	0.03755
2840.00	3.5211	1.476	0.000	0.008	0.000	0.03755
2860.00	3.4965	1.476	0.000	0.008	0.000	0.03755
2880.00	3.4722	1.476	0.000	0.008	0.000	0.03760
2900.00	3.4483	1.476	0.000	0.008	0.000	0.03760
2920.00	3.4247	1.476	0.000	0.008	0.000	0.03760
2940.00	3.4014	1.476	0.000	0.008	0.000	0.03760
2960.00	3.3784	1.476	0.000	0.008	0.000	0.03760
2980.00	3.3557	1.476	0.000	0.008	0.000	0.03765
3000.00	3.3333	1.476	0.000	0.008	0.000	0.03765
3020.00	3.3113	1.476	0.000	0.008	0.000	0.03765
3040.00	3.2895	1.476	0.000	0.008	0.000	0.03765

Table 2. Potassium Chloride (KCl).

PAGE 4

WN	WL	N	K	DN	DK	R
3060.00	3.2680	1.476	0.000	0.008	0.000	0.03765
3080.00	3.2468	1.477	0.000	0.008	0.000	0.03770
3100.00	3.2258	1.477	0.000	0.008	0.000	0.03770
3120.00	3.2051	1.477	0.000	0.008	0.000	0.03770
3140.00	3.1847	1.477	0.000	0.008	0.000	0.03770
3160.00	3.1646	1.477	0.000	0.008	0.000	0.03770
3180.00	3.1447	1.477	0.000	0.008	0.000	0.03770
3200.00	3.1250	1.477	0.000	0.008	0.000	0.03770
3220.00	3.1056	1.477	0.000	0.008	0.000	0.03770
3240.00	3.0864	1.477	0.000	0.008	0.000	0.03775
3260.00	3.0675	1.477	0.000	0.008	0.000	0.03775
3280.00	3.0488	1.477	0.000	0.008	0.000	0.03775
3300.00	3.0303	1.477	0.000	0.008	0.000	0.03775
3320.00	3.0120	1.477	0.000	0.008	0.000	0.03775
3340.00	2.9940	1.477	0.000	0.008	0.000	0.03775
3360.00	2.9762	1.477	0.000	0.008	0.000	0.03775
3380.00	2.9586	1.477	0.000	0.008	0.000	0.03775
3400.00	2.9412	1.477	0.000	0.008	0.000	0.03775
3420.00	2.9240	1.477	0.000	0.008	0.000	0.03775
3440.00	2.9070	1.478	0.000	0.008	0.000	0.03780
3460.00	2.8902	1.478	0.000	0.008	0.000	0.03780
3480.00	2.8736	1.478	0.000	0.008	0.000	0.03780
3500.00	2.8571	1.478	0.000	0.008	0.000	0.03780
3520.00	2.8409	1.478	0.000	0.008	0.000	0.03780
3540.00	2.8249	1.478	0.000	0.008	0.000	0.03780
3560.00	2.8090	1.478	0.000	0.008	0.000	0.03780
3580.00	2.7933	1.478	0.000	0.008	0.000	0.03780
3600.00	2.7778	1.478	0.000	0.008	0.000	0.03780
3620.00	2.7624	1.478	0.000	0.008	0.000	0.03780
3640.00	2.7473	1.478	0.000	0.008	0.000	0.03785
3660.00	2.7322	1.478	0.000	0.008	0.000	0.03785
3680.00	2.7174	1.478	0.000	0.008	0.000	0.03785
3700.00	2.7027	1.478	0.000	0.008	0.000	0.03785
3720.00	2.6882	1.478	0.000	0.008	0.000	0.03785
3740.00	2.6738	1.478	0.000	0.008	0.000	0.03785
3760.00	2.6596	1.478	0.000	0.008	0.000	0.03785
3780.00	2.6455	1.478	0.000	0.008	0.000	0.03785
3800.00	2.6316	1.478	0.000	0.008	0.000	0.03785
3820.00	2.6178	1.478	0.000	0.008	0.000	0.03785
3840.00	2.6042	1.478	0.000	0.008	0.000	0.03785
3860.00	2.5907	1.478	0.000	0.008	0.000	0.03785
3880.00	2.5773	1.478	0.000	0.008	0.000	0.03785
3900.00	2.5641	1.478	0.000	0.008	0.000	0.03785
3920.00	2.5510	1.478	0.000	0.008	0.000	0.03785
3940.00	2.5381	1.478	0.000	0.008	0.000	0.03790
3960.00	2.5253	1.478	0.000	0.008	0.000	0.03790
3980.00	2.5126	1.478	0.000	0.008	0.000	0.03790
4000.00	2.5000	1.478	0.000	0.008	0.000	0.03790
4032.26	2.4800	1.478	0.000	0.008	0.000	0.03790
4065.04	2.4600	1.479	0.000	0.008	0.000	0.03800

Table 2. Potassium Chloride (KCl).

PAGE 5

WN	WL	N	K	DN	DK	R
4098.36	2.4400	1.479	0.000	0.008	0.000	0.03800
4132.23	2.4200	1.479	0.000	0.008	0.000	0.03805
4166.67	2.4000	1.480	0.000	0.008	0.000	0.03810
4201.68	2.3800	1.480	0.000	0.008	0.000	0.03815
4237.29	2.3600	1.480	0.000	0.008	0.000	0.03815
4273.50	2.3400	1.481	0.000	0.008	0.000	0.03820
4310.35	2.3200	1.481	0.000	0.008	0.000	0.03825
4347.83	2.3000	1.482	0.000	0.008	0.000	0.03835
4385.96	2.2800	1.482	0.000	0.008	0.000	0.03835
4424.78	2.2600	1.482	0.000	0.008	0.000	0.03835
4464.29	2.2400	1.482	0.000	0.008	0.000	0.03840
4504.50	2.2200	1.482	0.000	0.008	0.000	0.03840
4545.45	2.2000	1.482	0.000	0.008	0.000	0.03840
4587.16	2.1800	1.483	0.000	0.008	0.000	0.03845
4629.63	2.1600	1.483	0.000	0.008	0.000	0.03845
4672.90	2.1400	1.483	0.000	0.008	0.000	0.03850
4716.98	2.1200	1.483	0.000	0.008	0.000	0.03855
4761.90	2.1000	1.484	0.000	0.008	0.000	0.03860
4807.69	2.0800	1.484	0.000	0.008	0.000	0.03860
4854.37	2.0600	1.484	0.000	0.008	0.000	0.03865
4901.96	2.0400	1.484	0.000	0.008	0.000	0.03865
4950.50	2.0200	1.484	0.000	0.008	0.000	0.03865
5000.00	2.0000	1.484	0.000	0.008	0.000	0.03865
5050.50	1.9800	1.485	0.000	0.008	0.000	0.03870
5102.04	1.9500	1.485	0.000	0.008	0.000	0.03870
5154.64	1.9400	1.485	0.000	0.008	0.000	0.03870
5208.33	1.9200	1.485	0.000	0.008	0.000	0.03875
5263.16	1.9000	1.485	0.000	0.008	0.000	0.03875
5319.15	1.8800	1.485	0.000	0.008	0.000	0.03875
5376.34	1.8600	1.485	0.000	0.008	0.000	0.03875
5434.78	1.8400	1.485	0.000	0.008	0.000	0.03875
5494.50	1.8200	1.485	0.000	0.008	0.000	0.03875
5555.56	1.8000	1.485	0.000	0.008	0.000	0.03880
5617.98	1.7800	1.485	0.000	0.008	0.000	0.03880
5681.82	1.7600	1.485	0.000	0.008	0.000	0.03880
5747.13	1.7400	1.485	0.000	0.008	0.000	0.03880
5813.95	1.7200	1.485	0.000	0.008	0.000	0.03880
5882.35	1.7000	1.485	0.000	0.008	0.000	0.03880
5952.38	1.6800	1.486	0.000	0.008	0.000	0.03885
6024.10	1.6600	1.486	0.000	0.008	0.000	0.03885
6097.56	1.6400	1.486	0.000	0.008	0.000	0.03885
6172.84	1.6200	1.486	0.000	0.008	0.000	0.03890
6250.00	1.6000	1.486	0.000	0.008	0.000	0.03890
6329.11	1.5800	1.486	0.000	0.008	0.000	0.03890
6410.26	1.5600	1.486	0.000	0.008	0.000	0.03890
6493.51	1.5400	1.486	0.000	0.008	0.000	0.03895
6578.95	1.5200	1.486	0.000	0.008	0.000	0.03895
6666.67	1.5000	1.486	0.000	0.008	0.000	0.03895
6756.76	1.4800	1.487	0.000	0.008	0.000	0.03900
6849.31	1.4600	1.487	0.000	0.008	0.000	0.03900

Table 2. Potassium Chloride (KCl).

PAGE 6

WN	WL	N	K	DN	DK	R
6944.44	1.4400	1.487	0.000	0.008	0.000	0.03900
7042.25	1.4200	1.487	0.000	0.008	0.000	0.03905
7142.86	1.4000	1.487	0.000	0.008	0.000	0.03905
7246.38	1.3800	1.488	0.000	0.008	0.000	0.03910
7352.94	1.3600	1.488	0.000	0.008	0.000	0.03910
7462.69	1.3400	1.488	0.000	0.008	0.000	0.03915
7575.76	1.3200	1.488	0.000	0.008	0.000	0.03915
7692.31	1.3000	1.488	0.000	0.008	0.000	0.03920
7812.50	1.2800	1.488	0.000	0.008	0.000	0.03920
7936.51	1.2600	1.489	0.000	0.008	0.000	0.03925
8064.52	1.2400	1.489	0.000	0.008	0.000	0.03925
8196.72	1.2200	1.489	0.000	0.008	0.000	0.03930
8333.33	1.2000	1.489	0.000	0.008	0.000	0.03930
8474.58	1.1800	1.489	0.000	0.008	0.000	0.03930
8620.69	1.1600	1.490	0.000	0.008	0.000	0.03935
8771.93	1.1400	1.490	0.000	0.008	0.000	0.03935
8928.57	1.1200	1.490	0.000	0.008	0.000	0.03935
9090.91	1.1000	1.489	0.000	0.008	0.000	0.03930
9259.26	1.0800	1.489	0.000	0.008	0.000	0.03930
9433.96	1.0600	1.489	0.000	0.008	0.000	0.03930
9615.38	1.0400	1.489	0.000	0.008	0.000	0.03930
9803.92	1.0200	1.488	0.000	0.008	0.000	0.03920
10000.00	1.0000	1.488	0.000	0.008	0.000	0.03920
10204.08	0.9800	1.488	0.000	0.008	0.000	0.03910
10416.67	0.9600	1.487	0.000	0.008	0.000	0.03905
10638.30	0.9400	1.487	0.000	0.008	0.000	0.03905
10869.56	0.9200	1.487	0.000	0.008	0.000	0.03900
11111.11	0.9000	1.486	0.000	0.008	0.000	0.03895
11363.64	0.8800	1.486	0.000	0.008	0.000	0.03895
11627.91	0.8600	1.486	0.000	0.008	0.000	0.03895
11904.76	0.8400	1.486	0.000	0.008	0.000	0.03890
12195.12	0.8200	1.485	0.000	0.008	0.000	0.03880
12500.00	0.8000	1.485	0.000	0.008	0.000	0.03875
12820.51	0.7800	1.484	0.000	0.008	0.000	0.03865
13157.89	0.7600	1.484	0.000	0.008	0.000	0.03865
13513.51	0.7400	1.484	0.000	0.008	0.000	0.03860
13888.89	0.7200	1.484	0.000	0.008	0.000	0.03860
14285.71	0.7000	1.484	0.000	0.008	0.000	0.03860
14705.88	0.6800	1.484	0.000	0.008	0.000	0.03860
15151.51	0.6600	1.484	0.000	0.008	0.000	0.03865
15625.00	0.6400	1.484	0.000	0.008	0.000	0.03860
16129.03	0.6200	1.485	0.000	0.008	0.000	0.03870
16666.67	0.6000	1.485	0.000	0.008	0.000	0.03875
17241.38	0.5800	1.486	0.000	0.008	0.000	0.03885
17857.14	0.5600	1.486	0.000	0.008	0.000	0.03890
18518.52	0.5400	1.487	0.000	0.008	0.000	0.03900
19230.77	0.5200	1.488	0.000	0.008	0.000	0.03915
20000.00	0.5000	1.490	0.000	0.008	0.000	0.03935
20833.33	0.4800	1.492	0.000	0.008	0.000	0.03965
21739.13	0.4600	1.495	0.000	0.008	0.000	0.04010

WN	WL	N	K	DN	DK	R
22727.27	0.4400	1.499	0.000	0.008	0.000	0.04055
23809.52	0.4200	1.503	0.000	0.008	0.000	0.04105
25000.00	0.4000	1.506	0.000	0.008	0.000	0.04150
26315.79	0.3800	1.510	0.000	0.008	0.000	0.04195
27777.78	0.3600	1.515	0.000	0.008	0.000	0.04265
29411.76	0.3400	1.523	0.000	0.008	0.000	0.04365
31250.00	0.3200	1.530	0.000	0.008	0.000	0.04465
33333.33	0.3000	1.538	0.000	0.008	0.000	0.04565
35714.29	0.2800	1.550	0.000	0.008	0.000	0.04730
38461.54	0.2600	1.567	0.000	0.007	0.000	0.04960
41666.67	0.2400	1.593	0.000	0.007	0.000	0.05310
45454.55	0.2200	1.636	0.000	0.007	0.000	0.05920

#### 4.3 Cesium Iodide (CsI).

Cesium iodide is an optically isotropic crystal with  $Fm\bar{3}m$  space group symmetry,  $Z=4$  molecular units/unit cell, and specific gravity of 4.51. The crystals used for this investigation were high purity 2.5 cm cubes obtained from Optovac Inc., North Brookfield, Ma.

A sample for measurement of reflectance spectra was prepared as follows. A 63.4-26.6-90 degree right angle prism was cut from one of the cubes to eliminate the possibility of measuring radiant flux reflected from the back surface of the sample. The 2.5 cm square face of the prism, from which the near normal incidence reflectance was to be measured, was polished very briefly on a lightly dampened lap, dried, and immediately transferred to the dry-air atmosphere of one of the spectrophotometers for acquisition of reflectance spectra.

Near normal incidence (6.5 deg) reflectance spectra were acquired relative to precalibrated first surface aluminum mirrors. A Perkin-Elmer 580B and a Varian 2300 spectrophotometers were used to acquire the relative reflectance spectrum of the sample in the  $180\text{--}4,000\text{ cm}^{-1}$  wave-number and  $200\text{--}2,500\text{ nm}$  wavelength regions, respectively. The relative reflectance spectrum was then multiplied by the reflectance spectrum of Al. The resultant reflectance spectrum of CsI is presented in Figures 5 and 6.

The complex refractive index  $n+ik$  for CsI was determined by Kramers-Kronig analysis of the reflectance spectrum. For this purpose the infrared reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $50\text{ cm}^{-1}$  by use of classical dispersion theory and parameters for that theory as tabulated previously by H.H. Li,<sup>3</sup> and extended from  $200\text{ nm}$  to  $112\text{ nm}$  by use of the measured reflectance spectrum reported by Said and Green.<sup>4</sup> Spectral values of  $n$  and  $k$  are presented graphically in Figures 5 and 6, and are tabulated in Table 3.

# CESIUM IODIDE

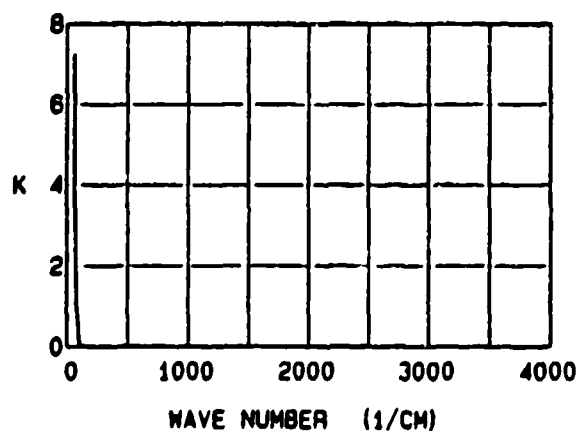
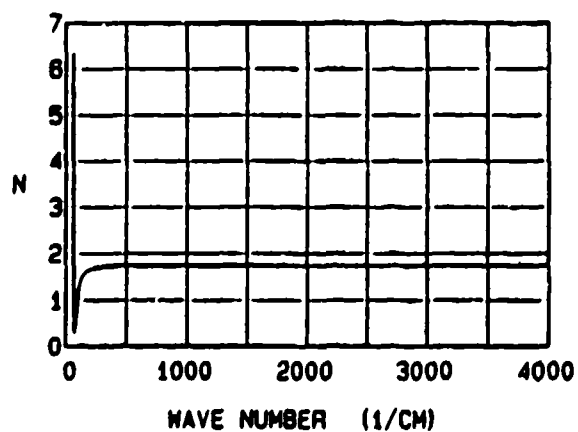
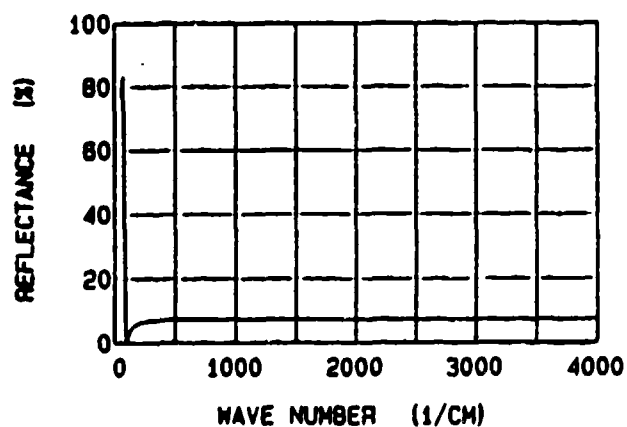


Figure 5. The infrared (60-4,000  $\text{cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for cesium iodide.



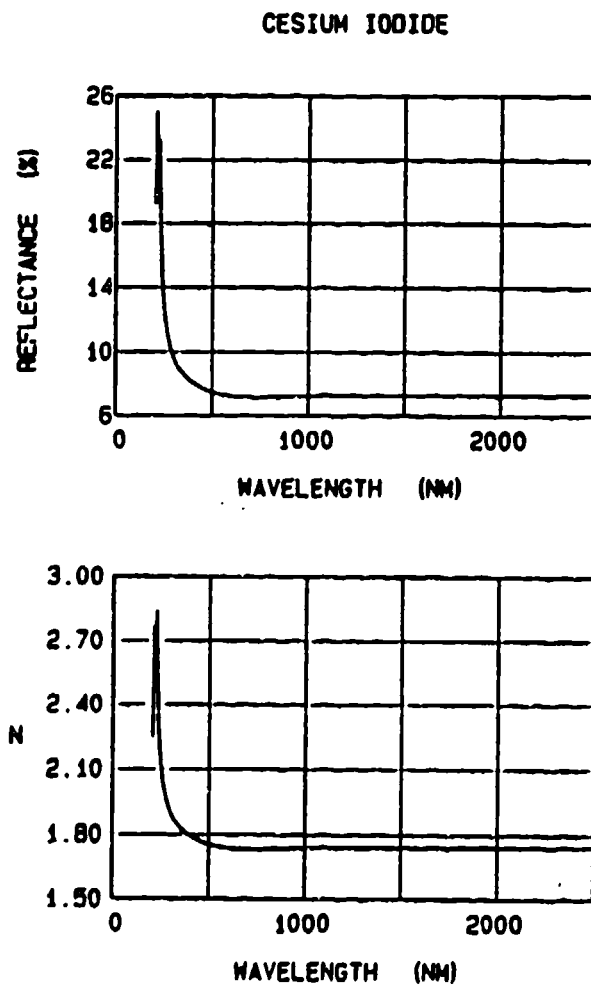


Figure 6. The uv-vis-nir (220-2,500 nm) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for cesium iodide.

Table 3. Cesium Iodide (CsI).

PAGE 1

WN	WL	N	K	DN	DK	R
60.00	166.6667	6.332	7.237	0.992	0.192	0.76135
80.00	125.0000	0.484	0.938	0.001	0.001	0.37160
100.00	100.0000	1.037	0.092	0.007	0.020	0.00235
120.00	83.3333	1.385	0.013	0.009	0.000	0.02605
140.00	71.4286	1.516	0.001	0.008	0.000	0.04205
160.00	62.5000	1.584	0.000	0.007	0.000	0.05105
180.00	55.5556	1.624	0.000	0.007	0.000	0.05660
200.00	50.0000	1.651	0.000	0.007	0.000	0.06030
220.00	45.4545	1.670	0.000	0.007	0.000	0.06290
240.00	41.6667	1.683	0.000	0.007	0.000	0.06475
260.00	38.4615	1.693	0.000	0.007	0.000	0.06625
280.00	35.7143	1.701	0.000	0.007	0.000	0.06735
300.00	33.3333	1.708	0.000	0.007	0.000	0.06830
320.00	31.2500	1.713	0.000	0.007	0.000	0.06910
340.00	29.4118	1.716	0.000	0.007	0.000	0.06955
360.00	27.7778	1.721	0.000	0.007	0.000	0.07015
380.00	26.3158	1.725	0.000	0.007	0.000	0.07075
400.00	25.0000	1.728	0.000	0.007	0.000	0.07115
420.00	23.8095	1.731	0.000	0.007	0.000	0.07160
440.00	22.7273	1.735	0.000	0.007	0.000	0.07220
460.00	21.7391	1.736	0.000	0.007	0.000	0.07230
480.00	20.8333	1.737	0.000	0.007	0.000	0.07245
500.00	20.0000	1.737	0.000	0.007	0.000	0.07255
520.00	19.2308	1.738	0.000	0.007	0.000	0.07260
540.00	18.5185	1.738	0.000	0.007	0.000	0.07270
560.00	17.8571	1.738	0.000	0.007	0.000	0.07270
580.00	17.2414	1.739	0.000	0.007	0.000	0.07275
600.00	16.6667	1.739	0.000	0.007	0.000	0.07275
620.00	16.1290	1.739	0.000	0.007	0.000	0.07275
640.00	15.6250	1.738	0.000	0.007	0.000	0.07270
660.00	15.1515	1.738	0.000	0.007	0.000	0.07270
680.00	14.7059	1.738	0.000	0.007	0.000	0.07270
700.00	14.2857	1.738	0.000	0.007	0.000	0.07265
720.00	13.8889	1.738	0.000	0.007	0.000	0.07265
740.00	13.5135	1.738	0.000	0.007	0.000	0.07270
760.00	13.1579	1.738	0.000	0.007	0.000	0.07270
780.00	12.8205	1.739	0.000	0.007	0.000	0.07275
800.00	12.5000	1.739	0.000	0.007	0.000	0.07275
820.00	12.1951	1.739	0.000	0.007	0.000	0.07280
840.00	11.9048	1.739	0.000	0.007	0.000	0.07280
860.00	11.6279	1.739	0.000	0.007	0.000	0.07285
880.00	11.3636	1.739	0.000	0.007	0.000	0.07285
900.00	11.1111	1.740	0.000	0.007	0.000	0.07290
920.00	10.8696	1.740	0.000	0.007	0.000	0.07290
940.00	10.6383	1.740	0.000	0.007	0.000	0.07295
960.00	10.4167	1.740	0.000	0.007	0.000	0.07295
980.00	10.2041	1.740	0.000	0.007	0.000	0.07295
1000.00	10.0000	1.740	0.000	0.007	0.000	0.07295
1020.00	9.8039	1.740	0.000	0.007	0.000	0.07295
1040.00	9.6154	1.740	0.000	0.007	0.000	0.07290

Table 3. Cesium Iodide (CsI).

PAGE 2

WN	WL	N	K	DN	DK	R
1060.00	9.4340	1.740	0.000	0.007	0.000	0.07290
1080.00	9.2593	1.739	0.000	0.007	0.000	0.07285
1100.00	9.0909	1.739	0.000	0.007	0.000	0.07285
1120.00	8.9286	1.739	0.000	0.007	0.000	0.07285
1140.00	8.7719	1.739	0.000	0.007	0.000	0.07280
1160.00	8.6207	1.739	0.000	0.007	0.000	0.07280
1180.00	8.4746	1.739	0.000	0.007	0.000	0.07280
1200.00	8.3333	1.739	0.000	0.007	0.000	0.07280
1220.00	8.1967	1.739	0.000	0.007	0.000	0.07280
1240.00	8.0645	1.739	0.000	0.007	0.000	0.07275
1260.00	7.9365	1.739	0.000	0.007	0.000	0.07275
1280.00	7.8125	1.739	0.000	0.007	0.000	0.07275
1300.00	7.6923	1.739	0.000	0.007	0.000	0.07275
1320.00	7.5758	1.739	0.000	0.007	0.000	0.07275
1340.00	7.4627	1.739	0.000	0.007	0.000	0.07275
1360.00	7.3529	1.739	0.000	0.007	0.000	0.07275
1380.00	7.2464	1.739	0.000	0.007	0.000	0.07275
1400.00	7.1429	1.739	0.000	0.007	0.000	0.07275
1420.00	7.0423	1.739	0.000	0.007	0.000	0.07275
1440.00	6.9444	1.739	0.000	0.007	0.000	0.07275
1460.00	6.8493	1.739	0.000	0.007	0.000	0.07275
1480.00	6.7568	1.739	0.000	0.007	0.000	0.07275
1500.00	6.6667	1.739	0.000	0.007	0.000	0.07275
1520.00	6.5789	1.739	0.000	0.007	0.000	0.07275
1540.00	6.4935	1.739	0.000	0.007	0.000	0.07275
1560.00	6.4103	1.738	0.000	0.007	0.000	0.07270
1580.00	6.3291	1.738	0.000	0.007	0.000	0.07270
1600.00	6.2500	1.738	0.000	0.007	0.000	0.07270
1620.00	6.1728	1.738	0.000	0.007	0.000	0.07270
1640.00	6.0976	1.738	0.000	0.007	0.000	0.07270
1660.00	6.0241	1.738	0.000	0.007	0.000	0.07265
1680.00	5.9524	1.738	0.000	0.007	0.000	0.07265
1700.00	5.8824	1.738	0.000	0.007	0.000	0.07265
1720.00	5.8140	1.738	0.000	0.007	0.000	0.07265
1740.00	5.7471	1.738	0.000	0.007	0.000	0.07265
1760.00	5.6818	1.738	0.000	0.007	0.000	0.07265
1780.00	5.6180	1.738	0.000	0.007	0.000	0.07265
1800.00	5.5556	1.738	0.000	0.007	0.000	0.07260
1820.00	5.4945	1.738	0.000	0.007	0.000	0.07260
1840.00	5.4348	1.738	0.000	0.007	0.000	0.07260
1860.00	5.3763	1.738	0.000	0.007	0.000	0.07260
1880.00	5.3191	1.738	0.000	0.007	0.000	0.07260
1900.00	5.2632	1.738	0.000	0.007	0.000	0.07260
1920.00	5.2083	1.737	0.000	0.007	0.000	0.07255
1940.00	5.1546	1.737	0.000	0.007	0.000	0.07255
1960.00	5.1020	1.737	0.000	0.007	0.000	0.07255
1980.00	5.0505	1.737	0.000	0.007	0.000	0.07255
2000.00	5.0000	1.737	0.000	0.007	0.000	0.07255
2020.00	4.9505	1.737	0.000	0.007	0.000	0.07255
2040.00	4.9020	1.737	0.000	0.007	0.000	0.07250

Table 3. Cesium Iodide (CsI).

PAGE 3

WN	WL	N	K	DN	DK	R
2060.00	4.8544	1.737	0.000	0.007	0.000	0.07250
2080.00	4.8077	1.737	0.000	0.007	0.000	0.07250
2100.00	4.7619	1.737	0.000	0.007	0.000	0.07250
2120.00	4.7170	1.737	0.000	0.007	0.000	0.07250
2140.00	4.6729	1.737	0.000	0.007	0.000	0.07250
2160.00	4.6296	1.737	0.000	0.007	0.000	0.07250
2180.00	4.5872	1.737	0.000	0.007	0.000	0.07250
2200.00	4.5455	1.737	0.000	0.007	0.000	0.07250
2220.00	4.5045	1.737	0.000	0.007	0.000	0.07250
2240.00	4.4643	1.737	0.000	0.007	0.000	0.07250
2260.00	4.4248	1.737	0.000	0.007	0.000	0.07250
2280.00	4.3860	1.737	0.000	0.007	0.000	0.07250
2300.00	4.3478	1.737	0.000	0.007	0.000	0.07250
2320.00	4.3103	1.737	0.000	0.007	0.000	0.07250
2340.00	4.2735	1.737	0.000	0.007	0.000	0.07250
2360.00	4.2373	1.737	0.000	0.007	0.000	0.07250
2380.00	4.2017	1.737	0.000	0.007	0.000	0.07250
2400.00	4.1667	1.737	0.000	0.007	0.000	0.07255
2420.00	4.1322	1.737	0.000	0.007	0.000	0.07255
2440.00	4.0984	1.737	0.000	0.007	0.000	0.07255
2460.00	4.0650	1.737	0.000	0.007	0.000	0.07255
2480.00	4.0323	1.737	0.000	0.007	0.000	0.07255
2500.00	4.0000	1.737	0.000	0.007	0.000	0.07255
2520.00	3.9683	1.737	0.000	0.007	0.000	0.07255
2540.00	3.9370	1.737	0.000	0.007	0.000	0.07255
2560.00	3.9063	1.737	0.000	0.007	0.000	0.07255
2580.00	3.8760	1.737	0.000	0.007	0.000	0.07255
2600.00	3.8462	1.737	0.000	0.007	0.000	0.07255
2620.00	3.8168	1.737	0.000	0.007	0.000	0.07255
2640.00	3.7879	1.737	0.000	0.007	0.000	0.07255
2660.00	3.7594	1.737	0.000	0.007	0.000	0.07255
2680.00	3.7313	1.737	0.000	0.007	0.000	0.07255
2700.00	3.7037	1.737	0.000	0.007	0.000	0.07255
2720.00	3.6765	1.737	0.000	0.007	0.000	0.07255
2740.00	3.6496	1.737	0.000	0.007	0.000	0.07255
2760.00	3.6232	1.737	0.000	0.007	0.000	0.07255
2780.00	3.5971	1.737	0.000	0.007	0.000	0.07255
2800.00	3.5714	1.737	0.000	0.007	0.000	0.07255
2820.00	3.5461	1.737	0.000	0.007	0.000	0.07255
2840.00	3.5211	1.737	0.000	0.007	0.000	0.07255
2860.00	3.4965	1.737	0.000	0.007	0.000	0.07255
2880.00	3.4722	1.737	0.000	0.007	0.000	0.07255
2900.00	3.4483	1.738	0.000	0.007	0.000	0.07260
2920.00	3.4247	1.738	0.000	0.007	0.000	0.07260
2940.00	3.4014	1.738	0.000	0.007	0.000	0.07260
2960.00	3.3784	1.738	0.000	0.007	0.000	0.07260
2980.00	3.3557	1.738	0.000	0.007	0.000	0.07260
3000.00	3.3333	1.738	0.000	0.007	0.000	0.07260
3020.00	3.3113	1.738	0.000	0.007	0.000	0.07260
3040.00	3.2895	1.738	0.000	0.007	0.000	0.07260

Table 3. Cesium Iodide (CsI).

PAGE 4

WN	WL	N	K	DN	DK	R
3060.00	3.2680	1.738	0.000	0.007	0.000	0.07260
3080.00	3.2468	1.738	0.000	0.007	0.000	0.07260
3100.00	3.2258	1.738	0.000	0.007	0.000	0.07260
3120.00	3.2051	1.738	0.000	0.007	0.000	0.07260
3140.00	3.1847	1.738	0.000	0.007	0.000	0.07260
3160.00	3.1646	1.737	0.000	0.007	0.000	0.07255
3180.00	3.1447	1.737	0.000	0.007	0.000	0.07255
3200.00	3.1250	1.737	0.000	0.007	0.000	0.07255
3220.00	3.1056	1.737	0.000	0.007	0.000	0.07255
3240.00	3.0864	1.737	0.000	0.007	0.000	0.07250
3260.00	3.0675	1.737	0.000	0.007	0.000	0.07250
3280.00	3.0488	1.737	0.000	0.007	0.000	0.07250
3300.00	3.0303	1.737	0.000	0.007	0.000	0.07250
3320.00	3.0120	1.737	0.000	0.007	0.000	0.07250
3340.00	2.9940	1.737	0.000	0.007	0.000	0.07255
3360.00	2.9762	1.737	0.000	0.007	0.000	0.07255
3380.00	2.9586	1.737	0.000	0.007	0.000	0.07255
3400.00	2.9412	1.738	0.000	0.007	0.000	0.07260
3420.00	2.9240	1.738	0.000	0.007	0.000	0.07260
3440.00	2.9070	1.738	0.000	0.007	0.000	0.07260
3460.00	2.8902	1.738	0.000	0.007	0.000	0.07265
3480.00	2.8736	1.738	0.000	0.007	0.000	0.07265
3500.00	2.8571	1.738	0.000	0.007	0.000	0.07270
3520.00	2.8409	1.738	0.000	0.007	0.000	0.07270
3540.00	2.8249	1.739	0.000	0.007	0.000	0.07275
3560.00	2.8090	1.739	0.000	0.007	0.000	0.07275
3580.00	2.7933	1.739	0.000	0.007	0.000	0.07280
3600.00	2.7778	1.739	0.000	0.007	0.000	0.07280
3620.00	2.7624	1.739	0.000	0.007	0.000	0.07280
3640.00	2.7473	1.739	0.000	0.007	0.000	0.07285
3660.00	2.7322	1.739	0.000	0.007	0.000	0.07285
3680.00	2.7174	1.739	0.000	0.007	0.000	0.07285
3700.00	2.7027	1.739	0.000	0.007	0.000	0.07285
3720.00	2.6882	1.740	0.000	0.007	0.000	0.07290
3740.00	2.6738	1.740	0.000	0.007	0.000	0.07290
3760.00	2.6596	1.740	0.000	0.007	0.000	0.07290
3780.00	2.6455	1.740	0.000	0.007	0.000	0.07295
3800.00	2.6316	1.740	0.000	0.007	0.000	0.07295
3820.00	2.6178	1.740	0.000	0.007	0.000	0.07295
3840.00	2.6042	1.740	0.000	0.007	0.000	0.07295
3860.00	2.5907	1.740	0.000	0.007	0.000	0.07300
3880.00	2.5773	1.740	0.000	0.007	0.000	0.07300
3900.00	2.5641	1.740	0.000	0.007	0.000	0.07300
3920.00	2.5510	1.740	0.000	0.007	0.000	0.07300
3940.00	2.5381	1.741	0.000	0.007	0.000	0.07305
3960.00	2.5253	1.741	0.000	0.007	0.000	0.07305
3980.00	2.5126	1.741	0.000	0.007	0.000	0.07305
4000.00	2.5000	1.741	0.000	0.007	0.000	0.07305
4032.26	2.4800	1.740	0.000	0.007	0.000	0.07300
4065.04	2.4600	1.740	0.000	0.007	0.000	0.07300

Table 3. Cesium Iodide (CsI).

PAGE 5

WN	WL	N	K	DN	DK	R
4098.36	2.4400	1.740	0.000	0.007	0.000	0.07295
4132.23	2.4200	1.740	0.000	0.007	0.000	0.07295
4166.67	2.4000	1.740	0.000	0.007	0.000	0.07295
4201.68	2.3800	1.740	0.000	0.007	0.000	0.07295
4237.29	2.3600	1.740	0.000	0.007	0.000	0.07295
4273.50	2.3400	1.740	0.000	0.007	0.000	0.07295
4310.35	2.3200	1.740	0.000	0.007	0.000	0.07290
4347.83	2.3000	1.740	0.000	0.007	0.000	0.07290
4385.96	2.2800	1.739	0.000	0.007	0.000	0.07285
4424.78	2.2600	1.739	0.000	0.007	0.000	0.07285
4464.29	2.2400	1.739	0.000	0.007	0.000	0.07285
4504.50	2.2200	1.739	0.000	0.007	0.000	0.07285
4545.45	2.2000	1.740	0.000	0.007	0.000	0.07290
4587.16	2.1800	1.740	0.000	0.007	0.000	0.07290
4629.63	2.1600	1.740	0.000	0.007	0.000	0.07290
4672.90	2.1400	1.740	0.000	0.007	0.000	0.07290
4716.98	2.1200	1.740	0.000	0.007	0.000	0.07295
4761.90	2.1000	1.740	0.000	0.007	0.000	0.07295
4807.69	2.0800	1.740	0.000	0.007	0.000	0.07295
4854.37	2.0600	1.740	0.000	0.007	0.000	0.07295
4901.96	2.0400	1.740	0.000	0.007	0.000	0.07295
4950.50	2.0200	1.740	0.000	0.007	0.000	0.07295
5000.00	2.0000	1.740	0.000	0.007	0.000	0.07295
5050.50	1.9800	1.740	0.000	0.007	0.000	0.07300
5102.04	1.9600	1.740	0.000	0.007	0.000	0.07300
5154.64	1.9400	1.740	0.000	0.007	0.000	0.07300
5208.33	1.9200	1.740	0.000	0.007	0.000	0.07300
5263.16	1.9000	1.740	0.000	0.007	0.000	0.07300
5319.15	1.8800	1.740	0.000	0.007	0.000	0.07300
5376.34	1.8600	1.740	0.000	0.007	0.000	0.07300
5434.78	1.8400	1.740	0.000	0.007	0.000	0.07300
5494.50	1.8200	1.740	0.000	0.007	0.000	0.07295
5555.56	1.8000	1.740	0.000	0.007	0.000	0.07295
5617.98	1.7800	1.740	0.000	0.007	0.000	0.07295
5681.82	1.7600	1.740	0.000	0.007	0.000	0.07295
5747.13	1.7400	1.740	0.000	0.007	0.000	0.07295
5813.95	1.7200	1.740	0.000	0.007	0.000	0.07290
5882.35	1.7000	1.739	0.000	0.007	0.000	0.07285
5952.38	1.6800	1.739	0.000	0.007	0.000	0.07285
6024.10	1.6600	1.739	0.000	0.007	0.000	0.07280
6097.56	1.6400	1.739	0.000	0.007	0.000	0.07275
6172.84	1.6200	1.739	0.000	0.007	0.000	0.07275
6250.00	1.6000	1.738	0.000	0.007	0.000	0.07270
6329.11	1.5800	1.738	0.000	0.007	0.000	0.07270
6410.26	1.5600	1.738	0.000	0.007	0.000	0.07270
6493.51	1.5400	1.738	0.000	0.007	0.000	0.07270
6578.95	1.5200	1.738	0.000	0.007	0.000	0.07270
6666.67	1.5000	1.738	0.000	0.007	0.000	0.07270
6756.76	1.4800	1.738	0.000	0.007	0.000	0.07270
6849.31	1.4600	1.738	0.000	0.007	0.000	0.07270

Table 3. Cesium Iodide (CsI).

PAGE 6

WN	WL	N	K	DN	DK	R
6944.44	1.4400	1.738	0.000	0.007	0.000	0.07270
7042.25	1.4200	1.738	0.000	0.007	0.000	0.07270
7142.86	1.4000	1.739	0.000	0.007	0.000	0.07275
7246.38	1.3800	1.739	0.000	0.007	0.000	0.07280
7352.94	1.3600	1.739	0.000	0.007	0.000	0.07280
7462.69	1.3400	1.739	0.000	0.007	0.000	0.07285
7575.76	1.3200	1.739	0.000	0.007	0.000	0.07285
7692.31	1.3000	1.740	0.000	0.007	0.000	0.07290
7812.50	1.2800	1.740	0.000	0.007	0.000	0.07295
7936.51	1.2600	1.740	0.000	0.007	0.000	0.07295
8064.52	1.2400	1.740	0.000	0.007	0.000	0.07295
8196.72	1.2200	1.740	0.000	0.007	0.000	0.07300
8333.33	1.2000	1.740	0.000	0.007	0.000	0.07300
8474.58	1.1800	1.740	0.000	0.007	0.000	0.07300
8620.69	1.1600	1.740	0.000	0.007	0.000	0.07300
8771.93	1.1400	1.740	0.000	0.007	0.000	0.07295
8928.57	1.1200	1.740	0.000	0.007	0.000	0.07290
9090.91	1.1000	1.739	0.000	0.007	0.000	0.07285
9259.26	1.0800	1.739	0.000	0.007	0.000	0.07280
9433.96	1.0600	1.738	0.000	0.007	0.000	0.07265
9615.38	1.0400	1.738	0.000	0.007	0.000	0.07260
9803.92	1.0200	1.737	0.000	0.007	0.000	0.07250
10000.00	1.0000	1.736	0.000	0.007	0.000	0.07235
10204.08	0.9800	1.735	0.000	0.007	0.000	0.07225
10416.67	0.9600	1.735	0.000	0.007	0.000	0.07220
10638.30	0.9400	1.734	0.000	0.007	0.000	0.07205
10869.56	0.9200	1.734	0.000	0.007	0.000	0.07200
11111.11	0.9000	1.733	0.000	0.007	0.000	0.07195
11363.64	0.8800	1.733	0.000	0.007	0.000	0.07195
11627.91	0.8600	1.733	0.000	0.007	0.000	0.07190
11904.76	0.8400	1.732	0.000	0.007	0.000	0.07185
12195.12	0.8200	1.731	0.000	0.007	0.000	0.07170
12500.00	0.8000	1.730	0.000	0.007	0.000	0.07155
12820.51	0.7800	1.729	0.000	0.007	0.000	0.07135
13157.89	0.7600	1.729	0.000	0.007	0.000	0.07140
13513.51	0.7400	1.729	0.000	0.007	0.000	0.07135
13888.89	0.7200	1.729	0.000	0.007	0.000	0.07140
14285.71	0.7000	1.731	0.000	0.007	0.000	0.07160
14705.88	0.6800	1.731	0.000	0.007	0.000	0.07170
15151.51	0.6600	1.732	0.000	0.007	0.000	0.07180
15625.00	0.6400	1.734	0.000	0.007	0.000	0.07205
16129.03	0.6200	1.735	0.000	0.007	0.000	0.07225
16666.67	0.6000	1.737	0.000	0.007	0.000	0.07250
17241.38	0.5800	1.739	0.000	0.007	0.000	0.07285
17857.14	0.5600	1.740	0.000	0.007	0.000	0.07295
18518.52	0.5400	1.744	0.000	0.007	0.000	0.07350
19230.77	0.5200	1.748	0.000	0.007	0.000	0.07410
20000.00	0.5000	1.752	0.000	0.007	0.000	0.07465
20833.33	0.4800	1.757	0.000	0.007	0.000	0.07545
21739.13	0.4600	1.766	0.000	0.007	0.000	0.07665

Table 3. Cesium Iodide (CsI).

PAGE 7

WN	WL	N	K	DN	DK	R
22727.27	0.4400	1.774	0.000	0.007	0.000	0.07780
23809.52	0.4200	1.784	0.000	0.007	0.000	0.07930
25000.00	0.4000	1.794	0.000	0.007	0.000	0.08080
26315.79	0.3800	1.806	0.000	0.007	0.000	0.08255
27777.78	0.3600	1.822	0.000	0.007	0.000	0.08490
29411.76	0.3400	1.845	0.000	0.007	0.000	0.08820
31250.00	0.3200	1.867	0.000	0.007	0.000	0.09145
33333.33	0.3000	1.902	0.000	0.007	0.000	0.09665
35714.29	0.2800	1.955	0.000	0.007	0.000	0.10450
38461.54	0.2600	2.043	0.000	0.007	0.000	0.11745
41666.67	0.2400	2.227	0.000	0.007	0.000	0.14460
45451.61	0.2200	2.480	0.583	0.006	0.004	0.20325



#### 4.4 Cesium Bromide (CsBr).

Cesium bromide is an optically isotropic cubic crystal with  $Fm\bar{3}m$  space group symmetry,  $Z=4$  molecular units/unit cell, and specific gravity 4.44. The crystals used for this investigation were high purity 2.5 cm cubes obtained from Optovac Inc., North Brookfield, Ma.

A sample for measurement of reflectance spectra was prepared in a manner exactly similar to that for cesium iodide. And, the reflectance spectrum was acquired by use of a procedure similar to that described for cesium iodide in Sec. 4.3. The reflectance spectrum is presented in Figures 7 and 8.

Complex refractive index  $n+ik$  spectra for CsBr were determined by Kramers-Kronig analysis of the reflectance spectrum. For this purpose the reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $50\text{ cm}^{-1}$  by use of classical dispersion theory parameters previously tabulated for CsBr by H.H. Li.<sup>5</sup> We could not find vacuum-ultraviolet reflectance spectra in the literature for CsBr. Spectral values of  $n$  and  $k$  are presented graphically in Figures 7 and 8, and are tabulated in Table 4.

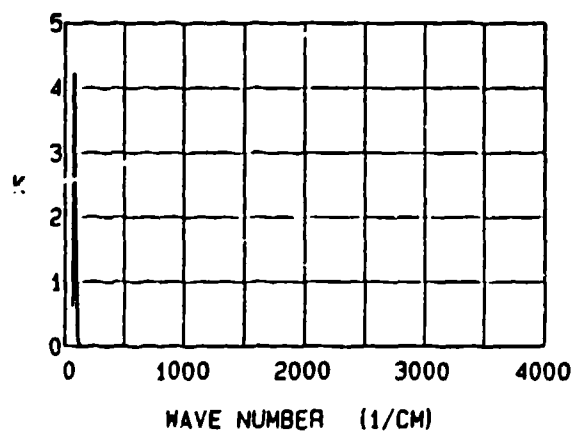
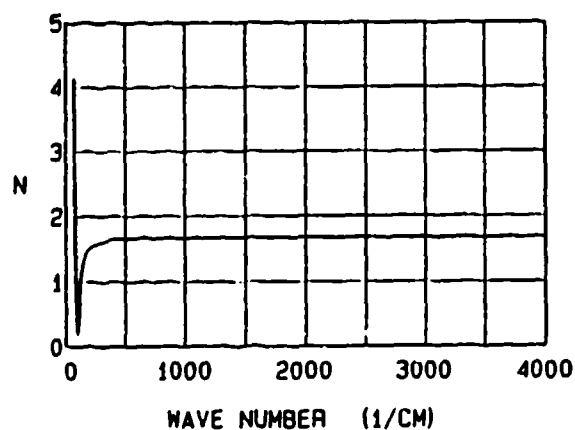
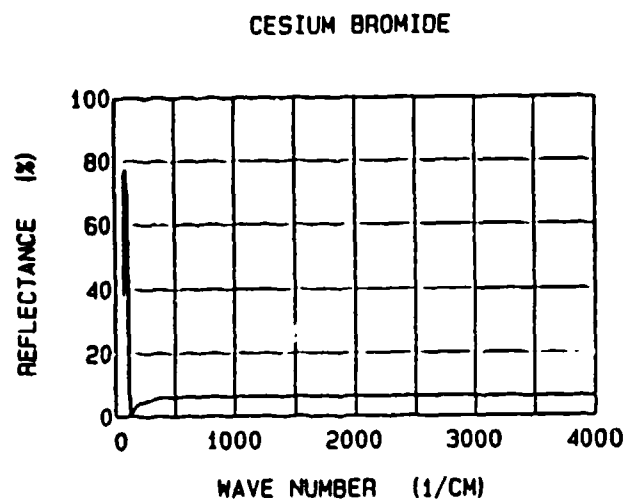


Figure 7. The infrared ( $67\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for cesium bromide .

CESIUM BROMIDE

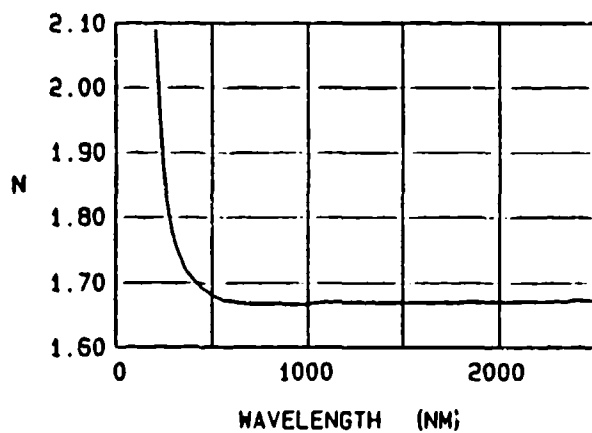
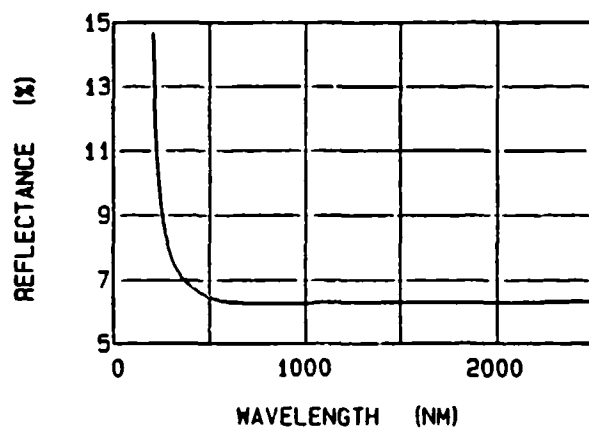


Figure 8. The uv-vis-nir (213-2,500 nm) reflectance and refractive index N for cesium bromide .

Table 4. Cesium Bromide (CsBr).

PAGE 1

WN	WL	N	K	DN	DK	R
67.00	149.2537	4.137	0.602	0.072	0.164	0.38140
87.00	114.9425	0.330	2.014	0.002	0.000	0.77330
107.00	93.4579	0.511	0.165	0.002	0.000	0.11530
127.00	78.7402	1.151	0.027	0.016	0.003	0.00505
147.00	68.0272	1.339	0.011	0.009	0.000	0.02100
167.00	59.8802	1.431	0.004	0.008	0.000	0.03140
187.00	53.4759	1.485	0.000	0.008	0.001	0.03805
207.00	48.3092	1.519	0.000	0.008	0.000	0.04250
227.00	44.0529	1.543	0.000	0.008	0.000	0.04565
247.00	40.4858	1.561	0.000	0.007	0.000	0.04800
267.00	37.4532	1.581	0.000	0.007	0.000	0.05070
287.00	34.8432	1.595	0.000	0.007	0.000	0.05260
307.00	32.5733	1.606	0.000	0.007	0.000	0.05405
327.00	30.5810	1.615	0.000	0.007	0.000	0.05535
347.00	28.8184	1.624	0.000	0.007	0.000	0.05650
367.00	27.2480	1.632	0.000	0.007	0.000	0.05760
387.00	25.8398	1.636	0.000	0.007	0.000	0.05820
407.00	24.5700	1.640	0.000	0.007	0.000	0.05880
427.00	23.4192	1.645	0.000	0.007	0.000	0.05940
447.00	22.3714	1.649	0.000	0.007	0.000	0.06000
467.00	21.4133	1.653	0.000	0.007	0.000	0.06055
487.00	20.5339	1.655	0.000	0.007	0.000	0.06080
507.00	19.7239	1.656	0.000	0.007	0.000	0.06100
527.00	18.9753	1.658	0.000	0.007	0.000	0.06125
547.00	18.2815	1.659	0.000	0.007	0.000	0.06145
567.00	17.6367	1.661	0.000	0.007	0.000	0.06165
587.00	17.0358	1.661	0.000	0.007	0.000	0.06170
607.00	16.4745	1.661	0.000	0.007	0.000	0.06175
627.00	15.9490	1.662	0.000	0.007	0.000	0.06180
647.00	15.4560	1.662	0.000	0.007	0.000	0.06185
667.00	14.9925	1.662	0.000	0.007	0.000	0.06185
687.00	14.5560	1.662	0.000	0.007	0.000	0.06185
707.00	14.1443	1.662	0.000	0.007	0.000	0.06185
727.00	13.7552	1.662	0.000	0.007	0.000	0.06185
747.00	13.3869	1.662	0.000	0.007	0.000	0.06185
767.00	13.0378	1.662	0.000	0.007	0.000	0.06185
787.00	12.7065	1.662	0.000	0.007	0.000	0.06185
807.00	12.3916	1.662	0.000	0.007	0.000	0.06190
827.00	12.0919	1.662	0.000	0.007	0.000	0.06190
847.00	11.8064	1.663	0.000	0.007	0.000	0.06195
867.00	11.5340	1.663	0.000	0.007	0.000	0.06200
887.00	11.2740	1.664	0.000	0.007	0.000	0.06205
907.00	11.0254	1.664	0.000	0.007	0.000	0.06210
927.00	10.7875	1.665	0.000	0.007	0.000	0.06220
947.00	10.5597	1.665	0.000	0.007	0.000	0.06225
967.00	10.3413	1.665	0.000	0.007	0.000	0.06230
987.00	10.1317	1.666	0.000	0.007	0.000	0.06235
1007.00	9.9305	1.666	0.000	0.007	0.000	0.06240
1027.00	9.7371	1.666	0.000	0.007	0.000	0.06245
1047.00	9.5511	1.666	0.000	0.007	0.000	0.06245

Table 4. Cesium Bromide (CsBr).

PAGE 2

WN	WL	N	K	DN	DK	R
1067.00	9.3721	1.666	0.000	0.007	0.000	0.06245
1087.00	9.1996	1.667	0.000	0.007	0.000	0.06250
1107.00	9.0334	1.667	0.000	0.007	0.000	0.06250
1127.00	8.8731	1.667	0.000	0.007	0.000	0.06250
1147.00	8.7184	1.667	0.000	0.007	0.000	0.06250
1167.00	8.5690	1.667	0.000	0.007	0.000	0.06250
1187.00	8.4246	1.667	0.000	0.007	0.000	0.06250
1207.00	8.2850	1.667	0.000	0.007	0.000	0.06250
1227.00	8.1500	1.667	0.000	0.007	0.000	0.06250
1247.00	8.0192	1.667	0.000	0.007	0.000	0.06250
1267.00	7.8927	1.667	0.000	0.007	0.000	0.06250
1287.00	7.7700	1.667	0.000	0.007	0.000	0.06250
1307.00	7.6511	1.667	0.000	0.007	0.000	0.06255
1327.00	7.5358	1.667	0.000	0.007	0.000	0.06255
1347.00	7.4239	1.667	0.000	0.007	0.000	0.06255
1367.00	7.3153	1.667	0.000	0.007	0.000	0.06255
1387.00	7.2098	1.667	0.000	0.007	0.000	0.06260
1407.00	7.1073	1.667	0.000	0.007	0.000	0.06260
1427.00	7.0077	1.667	0.000	0.007	0.000	0.06260
1447.00	6.9109	1.668	0.000	0.007	0.000	0.06265
1467.00	6.8166	1.668	0.000	0.007	0.000	0.06265
1487.00	6.7249	1.668	0.000	0.007	0.000	0.06270
1507.00	6.6357	1.668	0.000	0.007	0.000	0.06270
1527.00	6.5488	1.668	0.000	0.007	0.000	0.06270
1547.00	6.4641	1.668	0.000	0.007	0.000	0.06275
1567.00	6.3816	1.668	0.000	0.007	0.000	0.06275
1587.00	6.3012	1.668	0.000	0.007	0.000	0.06275
1607.00	6.2228	1.668	0.000	0.007	0.000	0.06275
1627.00	6.1463	1.668	0.000	0.007	0.000	0.06275
1647.00	6.0716	1.669	0.000	0.007	0.000	0.06280
1667.00	5.9968	1.669	0.000	0.007	0.000	0.06280
1687.00	5.9277	1.669	0.000	0.007	0.000	0.06280
1707.00	5.8582	1.668	0.000	0.007	0.000	0.06275
1727.00	5.7904	1.668	0.000	0.007	0.000	0.06270
1747.00	5.7241	1.668	0.000	0.007	0.000	0.06275
1767.00	5.6593	1.668	0.000	0.007	0.000	0.06275
1787.00	5.5950	1.668	0.000	0.007	0.000	0.06275
1807.00	5.5340	1.668	0.000	0.007	0.000	0.06275
1827.00	5.4735	1.668	0.000	0.007	0.000	0.06270
1847.00	5.4142	1.668	0.000	0.007	0.000	0.06265
1867.00	5.3562	1.668	0.000	0.007	0.000	0.06270
1887.00	5.2994	1.668	0.000	0.007	0.000	0.06265
1907.00	5.2438	1.667	0.000	0.007	0.000	0.06260
1927.00	5.1894	1.668	0.000	0.007	0.000	0.06265
1947.00	5.1361	1.667	0.000	0.007	0.000	0.06260
1967.00	5.0839	1.667	0.000	0.007	0.000	0.06260
1987.00	5.0327	1.667	0.000	0.007	0.000	0.06255
2007.00	4.9826	1.667	0.000	0.007	0.000	0.06250
2027.00	4.9334	1.667	0.000	0.007	0.000	0.06255
2047.00	4.8852	1.667	0.000	0.007	0.000	0.06250

Table 4. Cesium Bromide (CsBr).

PAGE 3

WN	WL	N	K	DN	DK	R
2067.00	4.8379	1.666	0.000	0.007	0.000	0.06245
2087.00	4.7916	1.667	0.000	0.007	0.000	0.06250
2107.00	4.7461	1.666	0.000	0.007	0.000	0.06245
2127.00	4.7015	1.666	0.000	0.007	0.000	0.06240
2147.00	4.6577	1.666	0.000	0.007	0.000	0.06245
2167.00	4.6147	1.666	0.000	0.007	0.000	0.06245
2187.00	4.5725	1.666	0.000	0.007	0.000	0.06245
2207.00	4.5310	1.666	0.000	0.007	0.000	0.06245
2227.00	4.4903	1.666	0.000	0.007	0.000	0.06245
2247.00	4.4504	1.666	0.000	0.007	0.000	0.06245
2267.00	4.4111	1.666	0.000	0.007	0.000	0.06245
2287.00	4.3725	1.666	0.000	0.007	0.000	0.06245
2307.00	4.3346	1.666	0.000	0.007	0.000	0.06245
2327.00	4.2974	1.666	0.000	0.007	0.000	0.06245
2347.00	4.2608	1.666	0.000	0.007	0.000	0.06245
2367.00	4.2248	1.667	0.000	0.007	0.000	0.06250
2387.00	4.1894	1.667	0.000	0.007	0.000	0.06250
2407.00	4.1545	1.667	0.000	0.007	0.000	0.06250
2427.00	4.1203	1.667	0.000	0.007	0.000	0.06250
2447.00	4.0866	1.667	0.000	0.007	0.000	0.06250
2467.00	4.0535	1.667	0.000	0.007	0.000	0.06250
2487.00	4.0209	1.667	0.000	0.007	0.000	0.06255
2507.00	3.9888	1.667	0.000	0.007	0.000	0.06255
2527.00	3.9573	1.667	0.000	0.007	0.000	0.06255
2547.00	3.9262	1.667	0.000	0.007	0.000	0.06255
2567.00	3.8956	1.667	0.000	0.007	0.000	0.06255
2587.00	3.8655	1.667	0.000	0.007	0.000	0.06255
2607.00	3.8358	1.667	0.000	0.007	0.000	0.06255
2627.00	3.8066	1.667	0.000	0.007	0.000	0.06260
2647.00	3.7779	1.667	0.000	0.007	0.000	0.06260
2667.00	3.7495	1.667	0.000	0.007	0.000	0.06260
2687.00	3.7216	1.667	0.000	0.007	0.000	0.06260
2707.00	3.6941	1.667	0.000	0.007	0.000	0.06260
2727.00	3.6670	1.667	0.000	0.007	0.000	0.06260
2747.00	3.6403	1.668	0.000	0.007	0.000	0.06265
2767.00	3.6140	1.668	0.000	0.007	0.000	0.06265
2787.00	3.5881	1.668	0.000	0.007	0.000	0.06265
2807.00	3.5625	1.668	0.000	0.007	0.000	0.06265
2827.00	3.5373	1.668	0.000	0.007	0.000	0.06270
2847.00	3.5125	1.668	0.000	0.007	0.000	0.06270
2867.00	3.4880	1.668	0.000	0.007	0.000	0.06270
2887.00	3.4638	1.668	0.000	0.007	0.000	0.06270
2907.00	3.4400	1.668	0.000	0.007	0.000	0.06275
2927.00	3.4165	1.668	0.000	0.007	0.000	0.06275
2947.00	3.3933	1.668	0.000	0.007	0.000	0.06275
2967.00	3.3704	1.668	0.000	0.007	0.000	0.06275
2987.00	3.3478	1.668	0.000	0.007	0.000	0.06275
3007.00	3.3256	1.668	0.000	0.007	0.000	0.06275
3027.00	3.3036	1.668	0.000	0.007	0.000	0.06275
3047.00	3.2819	1.668	0.000	0.007	0.000	0.06275

Table 4. Cesium Bromide (CsBr).

PAGE 4

WN	WL	N	K	DN	DK	R
3067.00	3.2605	1.668	0.000	0.007	0.000	0.06275
3087.00	3.2394	1.668	0.000	0.007	0.000	0.06275
3107.00	3.2185	1.668	0.000	0.007	0.000	0.06275
3127.00	3.1980	1.668	0.000	0.007	0.000	0.06275
3147.00	3.1776	1.668	0.000	0.007	0.000	0.06275
3167.00	3.1576	1.669	0.000	0.007	0.000	0.06280
3187.00	3.1377	1.669	0.000	0.007	0.000	0.06280
3207.00	3.1182	1.669	0.000	0.007	0.000	0.06280
3227.00	3.0989	1.669	0.000	0.007	0.000	0.06280
3247.00	3.0798	1.669	0.000	0.007	0.000	0.06280
3267.00	3.0609	1.669	0.000	0.007	0.000	0.06280
3287.00	3.0423	1.669	0.000	0.007	0.000	0.06285
3307.00	3.0239	1.669	0.000	0.007	0.000	0.06285
3327.00	3.0057	1.669	0.000	0.007	0.000	0.06285
3347.00	2.9878	1.669	0.000	0.007	0.000	0.06285
3367.00	2.9700	1.669	0.000	0.007	0.000	0.06285
3387.00	2.9525	1.669	0.000	0.007	0.000	0.06285
3407.00	2.9351	1.669	0.000	0.007	0.000	0.06285
3427.00	2.9180	1.670	0.000	0.007	0.000	0.06290
3447.00	2.9011	1.670	0.000	0.007	0.000	0.06290
3467.00	2.8843	1.670	0.000	0.007	0.000	0.06290
3487.00	2.8678	1.670	0.000	0.007	0.000	0.06290
3507.00	2.8514	1.670	0.000	0.007	0.000	0.06290
3527.00	2.8353	1.670	0.000	0.007	0.000	0.06290
3547.00	2.8193	1.670	0.000	0.007	0.000	0.06290
3567.00	2.8035	1.670	0.000	0.007	0.000	0.06295
3587.00	2.7878	1.670	0.000	0.007	0.000	0.06295
3607.00	2.7724	1.670	0.000	0.007	0.000	0.06295
3627.00	2.7571	1.670	0.000	0.007	0.000	0.06295
3647.00	2.7420	1.670	0.000	0.007	0.000	0.06295
3667.00	2.7270	1.670	0.000	0.007	0.000	0.06300
3687.00	2.7122	1.670	0.000	0.007	0.000	0.06300
3707.00	2.6976	1.670	0.000	0.007	0.000	0.06300
3727.00	2.6831	1.670	0.000	0.007	0.000	0.06300
3747.00	2.6688	1.670	0.000	0.007	0.000	0.06300
3767.00	2.6546	1.671	0.000	0.007	0.000	0.06305
3787.00	2.6406	1.671	0.000	0.007	0.000	0.06305
3807.00	2.6267	1.671	0.000	0.007	0.000	0.06305
3827.00	2.6130	1.671	0.000	0.007	0.000	0.06310
3847.00	2.5994	1.671	0.000	0.007	0.000	0.06310
3867.00	2.5860	1.671	0.000	0.007	0.000	0.06310
3887.00	2.5727	1.671	0.000	0.007	0.000	0.06315
3907.00	2.5595	1.671	0.000	0.007	0.000	0.06315
3927.00	2.5465	1.671	0.000	0.007	0.000	0.06315
3947.00	2.5336	1.671	0.000	0.007	0.000	0.06315
3967.00	2.5208	1.672	0.000	0.007	0.000	0.06320
3987.00	2.5082	1.672	0.000	0.007	0.000	0.06320
4011.23	2.4930	1.672	0.000	0.007	0.000	0.06320
4043.67	2.4730	1.672	0.000	0.007	0.000	0.06320
4076.64	2.4530	1.672	0.000	0.007	0.000	0.06320

Table 4. Cesium Bromide (CsBr).

PAGE 5

WN	WL	N	K	DN	DK	R
4110.15	2.4330	1.672	0.000	0.007	0.000	0.06320
4144.22	2.4130	1.672	0.000	0.007	0.000	0.06320
4178.86	2.3930	1.672	0.000	0.007	0.000	0.06320
4214.07	2.3730	1.672	0.000	0.007	0.000	0.06320
4249.89	2.3530	1.671	0.000	0.007	0.000	0.06310
4286.33	2.3330	1.671	0.000	0.007	0.000	0.06310
4323.39	2.3130	1.671	0.000	0.007	0.000	0.06310
4361.10	2.2930	1.671	0.000	0.007	0.000	0.06305
4399.47	2.2730	1.671	0.000	0.007	0.000	0.06305
4438.53	2.2530	1.670	0.000	0.007	0.000	0.06300
4478.28	2.2330	1.670	0.000	0.007	0.000	0.06295
4518.75	2.2130	1.670	0.000	0.007	0.000	0.06295
4559.96	2.1930	1.670	0.000	0.007	0.000	0.06295
4601.93	2.1730	1.670	0.000	0.007	0.000	0.06290
4644.68	2.1530	1.670	0.000	0.007	0.000	0.06290
4688.23	2.1330	1.670	0.000	0.007	0.000	0.06290
4732.61	2.1130	1.670	0.000	0.007	0.000	0.06290
4777.83	2.0930	1.670	0.000	0.007	0.000	0.06290
4823.93	2.0730	1.670	0.000	0.007	0.000	0.06290
4870.92	2.0530	1.669	0.000	0.007	0.000	0.06285
4918.84	2.0330	1.670	0.000	0.007	0.000	0.06295
4967.71	2.0130	1.670	0.000	0.007	0.000	0.06290
5017.56	1.9930	1.670	0.000	0.007	0.000	0.06290
5068.42	1.9730	1.670	0.000	0.007	0.000	0.06290
5120.33	1.9530	1.670	0.000	0.007	0.000	0.06290
5173.31	1.9330	1.670	0.000	0.007	0.000	0.06290
5227.39	1.9130	1.670	0.000	0.007	0.000	0.06290
5282.62	1.8930	1.670	0.000	0.007	0.000	0.06290
5339.03	1.8730	1.670	0.000	0.007	0.000	0.06290
5396.65	1.8530	1.670	0.000	0.007	0.000	0.06290
5455.54	1.8330	1.670	0.000	0.007	0.000	0.06290
5515.72	1.8130	1.669	0.000	0.007	0.000	0.06285
5577.25	1.7930	1.669	0.000	0.007	0.000	0.06285
5640.16	1.7730	1.669	0.000	0.007	0.000	0.06285
5704.51	1.7530	1.669	0.000	0.007	0.000	0.06285
5770.34	1.7330	1.669	0.000	0.007	0.000	0.06285
5837.71	1.7130	1.669	0.000	0.007	0.000	0.06285
5906.67	1.6930	1.669	0.000	0.007	0.000	0.06285
5977.29	1.6730	1.669	0.000	0.007	0.000	0.06285
6049.61	1.6530	1.669	0.000	0.007	0.000	0.06285
6123.70	1.6330	1.669	0.000	0.007	0.000	0.06285
6199.63	1.6130	1.669	0.000	0.007	0.000	0.06285
6277.46	1.5930	1.669	0.000	0.007	0.000	0.06285
6357.28	1.5730	1.669	0.000	0.007	0.000	0.06285
6439.15	1.5530	1.669	0.000	0.007	0.000	0.06285
6523.16	1.5330	1.669	0.000	0.007	0.000	0.06285
6609.38	1.5130	1.669	0.000	0.007	0.000	0.06285
6697.92	1.4930	1.669	0.000	0.007	0.000	0.06285
6788.87	1.4730	1.669	0.000	0.007	0.000	0.06285
6882.31	1.4530	1.669	0.000	0.007	0.000	0.06285



IN	WL	N	K	DN	DK	R
6978.37	1.4330	1.669	0.000	0.007	0.000	0.06285
7077.14	1.4130	1.669	0.000	0.007	0.000	0.06285
7178.75	1.3930	1.669	0.000	0.007	0.000	0.06285
7283.32	1.3730	1.669	0.000	0.007	0.000	0.06285
7390.98	1.3530	1.669	0.000	0.007	0.000	0.06285
7501.88	1.3330	1.670	0.000	0.007	0.000	0.06290
7616.15	1.3130	1.670	0.000	0.007	0.000	0.06295
7733.95	1.2930	1.670	0.000	0.007	0.000	0.06295
7855.46	1.2730	1.670	0.000	0.007	0.000	0.06300
7980.85	1.2530	1.670	0.000	0.007	0.000	0.06300
8110.30	1.2330	1.670	0.000	0.007	0.000	0.06300
8244.02	1.2130	1.670	0.000	0.007	0.000	0.06300
8382.23	1.1930	1.670	0.000	0.007	0.000	0.06300
8525.15	1.1730	1.670	0.000	0.007	0.000	0.06300
8673.03	1.1530	1.671	0.000	0.007	0.000	0.06305
8826.13	1.1330	1.670	0.000	0.007	0.000	0.06300
8984.73	1.1130	1.670	0.000	0.007	0.000	0.06300
9149.13	1.0930	1.670	0.000	0.007	0.000	0.06300
9319.66	1.0730	1.670	0.000	0.007	0.000	0.06290
9496.68	1.0530	1.669	0.000	0.007	0.000	0.06280
9680.54	1.0330	1.668	0.000	0.007	0.000	0.06270
9871.67	1.0130	1.667	0.000	0.007	0.000	0.06260
10070.49	0.9930	1.667	0.000	0.007	0.000	0.06255
10277.49	0.9730	1.666	0.000	0.007	0.000	0.06245
10493.18	0.9530	1.666	0.000	0.007	0.000	0.06240
10718.11	0.9330	1.666	0.000	0.007	0.000	0.06240
10952.90	0.9130	1.666	0.000	0.007	0.000	0.06245
11198.21	0.8930	1.667	0.000	0.007	0.000	0.06250
11454.75	0.8730	1.667	0.000	0.007	0.000	0.06260
11723.33	0.8530	1.668	0.000	0.007	0.000	0.06270
12004.80	0.8330	1.668	0.000	0.007	0.000	0.06270
12300.12	0.8130	1.668	0.000	0.007	0.000	0.06270
12610.34	0.7930	1.667	0.000	0.007	0.000	0.06260
12936.61	0.7730	1.667	0.000	0.007	0.000	0.06260
13280.21	0.7530	1.667	0.000	0.007	0.000	0.06255
13642.56	0.7330	1.667	0.000	0.007	0.000	0.06255
14025.24	0.7130	1.667	0.000	0.007	0.000	0.06260
14430.01	0.6930	1.668	0.000	0.007	0.000	0.06265
14858.84	0.6730	1.668	0.000	0.007	0.000	0.06275
15313.94	0.6530	1.669	0.000	0.007	0.000	0.06285
15797.79	0.6330	1.670	0.000	0.007	0.000	0.06295
16313.21	0.6130	1.671	0.000	0.007	0.000	0.06305
16863.41	0.5930	1.672	0.000	0.007	0.000	0.06320
17452.01	0.5730	1.673	0.000	0.007	0.000	0.06335
18083.18	0.5530	1.673	0.000	0.007	0.000	0.06345
18761.73	0.5330	1.676	0.000	0.007	0.000	0.06380
19493.18	0.5130	1.679	0.000	0.007	0.000	0.06420
20283.98	0.4930	1.681	0.000	0.007	0.000	0.06455
21141.65	0.4730	1.687	0.000	0.007	0.000	0.06530
22075.05	0.4530	1.691	0.000	0.007	0.000	0.06590

Table 4. Cesium Bromide (CsBr).

PAGE 7

WN	WL	N	K	DN	DK	R
23094.69	0.4330	1.696	0.000	0.007	0.000	0.06660
24213.07	0.4130	1.701	0.000	0.007	0.000	0.06740
25445.29	0.3930	1.708	0.000	0.007	0.000	0.06835
26809.65	0.3730	1.715	0.000	0.007	0.000	0.06935
28328.61	0.3530	1.725	0.000	0.007	0.000	0.07080
30030.03	0.3330	1.739	0.000	0.007	0.001	0.07280
31948.88	0.3130	1.753	0.005	0.007	0.000	0.07475
34129.69	0.2930	1.774	0.011	0.007	0.000	0.07790
36630.04	0.2730	1.803	0.023	0.007	0.000	0.08210
39525.69	0.2530	1.844	0.048	0.007	0.001	0.08835
42918.45	0.2330	1.915	0.100	0.007	0.001	0.09955
46948.36	0.2130	2.022	0.258	0.006	0.002	0.12085

#### 4.5 Barium Fluoride ( $\text{BaF}_2$ ).

Barium fluoride is an optically isotropic cubic crystal with  $\text{Fm}\bar{3}\text{m}$  space group symmetry,  $Z=4$  molecular units/unit cell, and specific gravity of 4.89. The sample used for this investigation was a high purity 25 mm dia. x 8 mm thick circular window obtained from Optovac Inc., North Brookfield, Ma.

The sample was prepared for measurements of reflectance spectra by successive polishing of one surface with 9, 6, 3, 1, 0.25  $\mu$  diamond paste. The sample was rinsed with acetone after each polishing of the front face of the sample, the back face was roughened with coarse sand paper to eliminate specular reflectance from the back surface.

The reflectance spectrum for  $\text{BaF}_2$  was acquired as previously described in Sec. 4.1-4.3. The reflectance spectrum is presented in graphical form in Figures 9 and 10.

Complex refractive index  $n+ik$  spectra were determined by applying Kramers-Kronig methods to the reflectance spectrum. For this purpose the reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $0\text{ cm}^{-1}$  by use of classical dispersion parameters determined previously by Kaiser et al.<sup>6</sup> We could not find in the literature a vacuum ultraviolet reflectance spectrum for  $\text{BaF}_2$ . Spectral values of  $n$  and  $k$  are presented graphically in Figures 9 and 10, and in tabular form in Table 5.

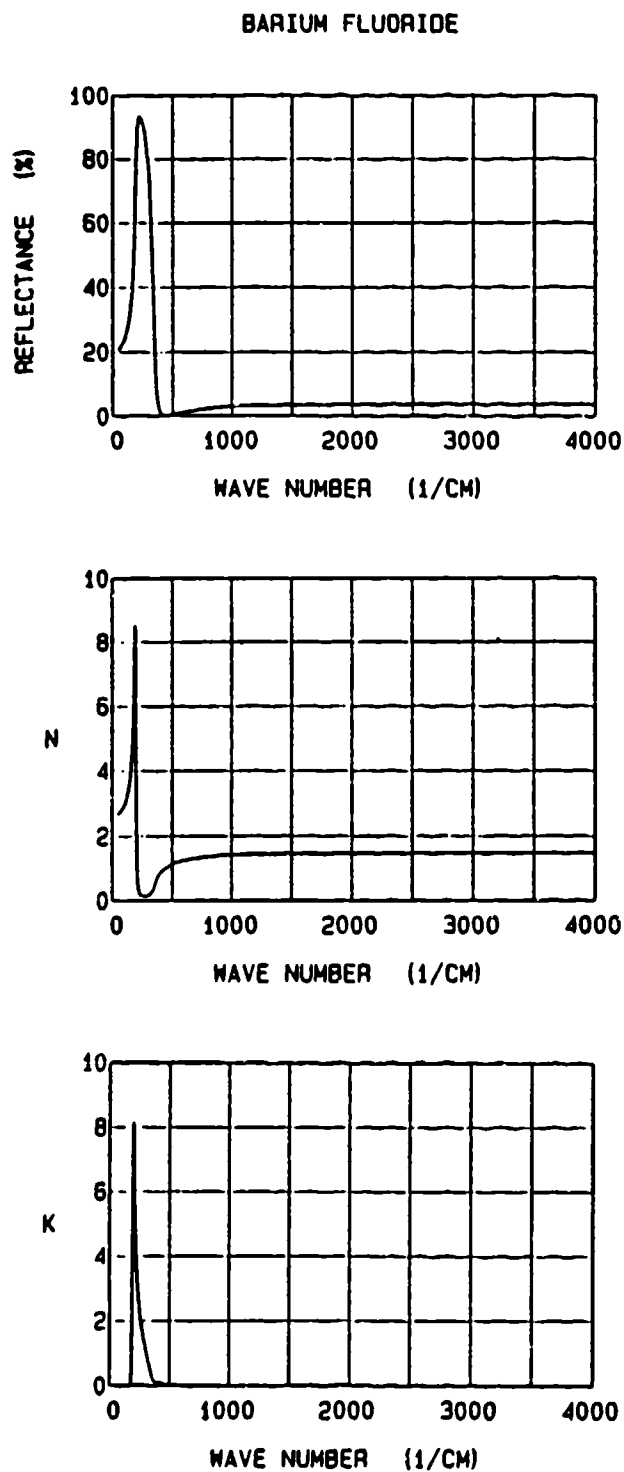


Figure 9. The infrared ( $60\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for barium fluoride.

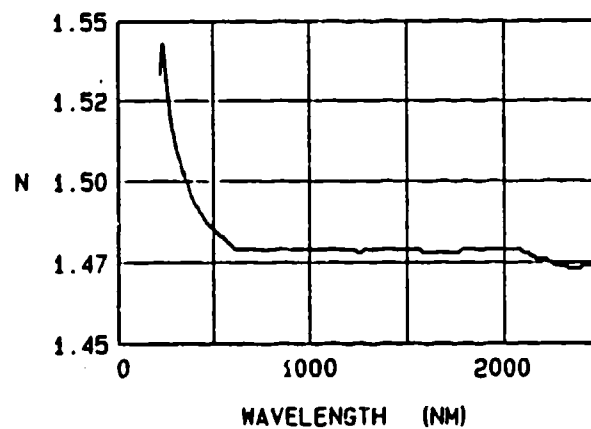
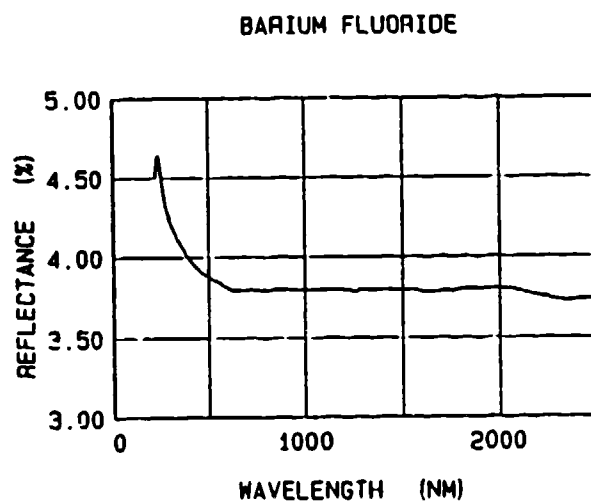


Figure 10. The uv-vis-nir (220-2,500 nm) reflectance and refractive index  $N$  for barium fluoride.

Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 1

WN	WL	N	K	DN	DK	R
60.00	166.6667	2.696	0.000	0.008	0.005	0.21255
80.00	125.0000	2.790	0.000	0.008	0.016	0.22510
100.00	100.0000	2.936	0.000	0.009	0.028	0.24415
120.00	83.3333	3.173	0.000	0.010	0.044	0.27345
140.00	71.4286	3.595	0.000	0.013	0.065	0.32135
160.00	62.5000	4.547	0.000	0.016	0.065	0.41130
180.00	55.5556	8.501	2.546	0.315	0.451	0.65035
200.00	50.0000	0.976	5.834	0.086	0.232	0.89775
220.00	45.4545	0.205	3.297	0.012	0.080	0.93400
240.00	41.6667	0.148	2.329	0.006	0.043	0.91305
260.00	38.4615	0.129	1.753	0.004	0.027	0.88240
280.00	35.7143	0.142	1.337	0.003	0.019	0.81805
300.00	33.3333	0.148	0.979	0.003	0.013	0.74280
320.00	31.2500	0.227	0.658	0.003	0.010	0.53755
340.00	29.4118	0.343	0.374	0.002	0.007	0.30395
360.00	27.7778	0.572	0.183	0.003	0.005	0.09025
380.00	26.3158	0.744	0.130	0.005	0.005	0.02785
400.00	25.0000	0.858	0.102	0.009	0.007	0.00910
420.00	23.8095	0.923	0.099	0.010	0.012	0.00435
440.00	22.7273	0.988	0.058	0.008	0.032	0.00090
460.00	21.7391	1.023	0.045	0.018	0.036	0.00065
480.00	20.8333	1.084	0.028	0.024	0.009	0.00185
500.00	20.0000	1.130	0.026	0.018	0.006	0.00395
520.00	19.2308	1.160	0.020	0.016	0.004	0.00570
540.00	18.5185	1.189	0.021	0.014	0.004	0.00770
560.00	17.8571	1.206	0.017	0.013	0.004	0.00895
580.00	17.2414	1.227	0.009	0.012	0.004	0.01065
600.00	16.6667	1.248	0.007	0.011	0.004	0.01245
620.00	16.1290	1.262	0.005	0.011	0.004	0.01370
640.00	15.6250	1.275	0.001	0.011	0.001	0.01495
660.00	15.1515	1.289	0.000	0.010	0.000	0.01625
680.00	14.7059	1.301	0.000	0.010	0.000	0.01745
700.00	14.2857	1.311	0.000	0.010	0.000	0.01850
720.00	13.8889	1.321	0.000	0.010	0.000	0.01955
740.00	13.5135	1.332	0.000	0.010	0.000	0.02070
760.00	13.1579	1.343	0.000	0.009	0.000	0.02180
780.00	12.8205	1.351	0.000	0.009	0.000	0.02275
800.00	12.5000	1.360	0.000	0.009	0.000	0.02370
820.00	12.1951	1.367	0.000	0.009	0.000	0.02455
840.00	11.9048	1.375	0.000	0.009	0.000	0.02535
860.00	11.6279	1.382	0.000	0.009	0.000	0.02620
880.00	11.3636	1.389	0.000	0.009	0.000	0.02700
900.00	11.1111	1.395	0.000	0.009	0.000	0.02770
920.00	10.8696	1.401	0.000	0.009	0.000	0.02840
940.00	10.6383	1.406	0.000	0.009	0.000	0.02905
960.00	10.4167	1.411	0.000	0.009	0.000	0.02960
980.00	10.2041	1.416	0.000	0.008	0.000	0.03015
1000.00	10.0000	1.419	0.000	0.008	0.000	0.03060
1020.00	9.8039	1.423	0.000	0.008	0.000	0.03100
1040.00	9.6154	1.426	0.000	0.008	0.000	0.03135

Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 2

WN	WL	N	K	DN	DK	R
1060.00	9.4340	1.428	0.000	0.008	0.000	0.03165
1080.00	9.2593	1.431	0.000	0.008	0.000	0.03195
1100.00	9.0909	1.433	0.000	0.008	0.000	0.03220
1120.00	8.9286	1.434	0.000	0.008	0.000	0.03240
1140.00	8.7719	1.436	0.000	0.008	0.000	0.03260
1160.00	8.6207	1.438	0.000	0.008	0.000	0.03285
1180.00	8.4746	1.440	0.000	0.008	0.000	0.03305
1200.00	8.3333	1.441	0.000	0.008	0.000	0.03325
1220.00	8.1967	1.442	0.000	0.008	0.000	0.03340
1240.00	8.0645	1.444	0.000	0.008	0.000	0.03355
1260.00	7.9365	1.444	0.000	0.008	0.000	0.03365
1280.00	7.8125	1.445	0.000	0.008	0.000	0.03375
1300.00	7.6923	1.446	0.000	0.008	0.000	0.03385
1320.00	7.5758	1.447	0.000	0.008	0.000	0.03395
1340.00	7.4627	1.448	0.000	0.008	0.000	0.03405
1360.00	7.3529	1.448	0.000	0.008	0.000	0.03410
1380.00	7.2464	1.449	0.000	0.008	0.000	0.03420
1400.00	7.1429	1.449	0.000	0.008	0.000	0.03425
1420.00	7.0423	1.450	0.000	0.008	0.000	0.03435
1440.00	6.9444	1.450	0.000	0.008	0.000	0.03440
1460.00	6.8493	1.451	0.000	0.008	0.000	0.03450
1480.00	6.7568	1.452	0.000	0.008	0.000	0.03455
1500.00	6.6667	1.452	0.000	0.008	0.000	0.03465
1520.00	6.5789	1.453	0.000	0.008	0.000	0.03470
1540.00	6.4935	1.454	0.000	0.008	0.000	0.03480
1560.00	6.4103	1.454	0.000	0.008	0.000	0.03490
1580.00	6.3291	1.455	0.000	0.008	0.000	0.03495
1600.00	6.2500	1.456	0.000	0.008	0.000	0.03505
1620.00	6.1728	1.456	0.000	0.008	0.000	0.03510
1640.00	6.0976	1.457	0.000	0.008	0.000	0.03520
1660.00	6.0241	1.457	0.000	0.008	0.000	0.03525
1680.00	5.9524	1.458	0.000	0.008	0.000	0.03535
1700.00	5.8824	1.458	0.000	0.008	0.000	0.03540
1720.00	5.8140	1.459	0.000	0.008	0.000	0.03545
1740.00	5.7471	1.460	0.000	0.008	0.000	0.03555
1760.00	5.6818	1.460	0.000	0.008	0.000	0.03560
1780.00	5.6180	1.460	0.000	0.008	0.000	0.03565
1800.00	5.5556	1.461	0.000	0.008	0.000	0.03570
1820.00	5.4945	1.461	0.000	0.008	0.000	0.03575
1840.00	5.4348	1.462	0.000	0.008	0.000	0.03580
1860.00	5.3763	1.462	0.000	0.008	0.000	0.03585
1880.00	5.3191	1.463	0.000	0.008	0.000	0.03595
1900.00	5.2632	1.463	0.000	0.008	0.000	0.03600
1920.00	5.2083	1.464	0.000	0.008	0.000	0.03605
1940.00	5.1546	1.464	0.000	0.008	0.000	0.03610
1960.00	5.1020	1.464	0.000	0.008	0.000	0.03615
1980.00	5.0505	1.465	0.000	0.008	0.000	0.03620
2000.00	5.0000	1.465	0.000	0.008	0.000	0.03620
2020.00	4.9505	1.465	0.000	0.008	0.000	0.03625
2040.00	4.9020	1.466	0.000	0.008	0.000	0.03630

Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 3

WN	WL	N	K	DN	DK	R
2060.00	4.8544	1.466	0.000	0.008	0.000	0.03630
2080.00	4.8077	1.466	0.000	0.008	0.000	0.03635
2100.00	4.7619	1.466	0.000	0.008	0.000	0.03635
2120.00	4.7170	1.466	0.000	0.008	0.000	0.03640
2140.00	4.6729	1.466	0.000	0.008	0.000	0.03640
2160.00	4.6296	1.467	0.000	0.008	0.000	0.03645
2180.00	4.5872	1.467	0.000	0.008	0.000	0.03645
2200.00	4.5455	1.467	0.000	0.008	0.000	0.03645
2220.00	4.5045	1.467	0.000	0.008	0.000	0.03645
2240.00	4.4643	1.467	0.000	0.008	0.000	0.03645
2260.00	4.4248	1.467	0.000	0.008	0.000	0.03650
2280.00	4.3860	1.467	0.000	0.008	0.000	0.03650
2300.00	4.3478	1.467	0.000	0.008	0.000	0.03650
2320.00	4.3103	1.467	0.000	0.008	0.000	0.03650
2340.00	4.2735	1.467	0.000	0.008	0.000	0.03650
2360.00	4.2373	1.468	0.000	0.008	0.000	0.03655
2380.00	4.2017	1.468	0.000	0.008	0.000	0.03655
2400.00	4.1667	1.468	0.000	0.008	0.000	0.03655
2420.00	4.1322	1.468	0.000	0.008	0.000	0.03655
2440.00	4.0984	1.468	0.000	0.008	0.000	0.03660
2460.00	4.0650	1.468	0.000	0.008	0.000	0.03660
2480.00	4.0323	1.468	0.000	0.008	0.000	0.03660
2500.00	4.0000	1.468	0.000	0.008	0.000	0.03660
2520.00	3.9683	1.468	0.000	0.008	0.000	0.03660
2540.00	3.9370	1.468	0.000	0.008	0.000	0.03665
2560.00	3.9063	1.468	0.000	0.008	0.000	0.03665
2580.00	3.8760	1.468	0.000	0.008	0.000	0.03665
2600.00	3.8462	1.468	0.000	0.008	0.000	0.03665
2620.00	3.8168	1.468	0.000	0.008	0.000	0.03665
2640.00	3.7879	1.468	0.000	0.008	0.000	0.03665
2660.00	3.7594	1.468	0.000	0.008	0.000	0.03665
2680.00	3.7313	1.468	0.000	0.008	0.000	0.03665
2700.00	3.7037	1.469	0.000	0.008	0.000	0.03670
2720.00	3.6765	1.469	0.000	0.008	0.000	0.03670
2740.00	3.6496	1.469	0.000	0.008	0.000	0.03670
2760.00	3.6232	1.469	0.000	0.008	0.000	0.03675
2780.00	3.5971	1.469	0.000	0.008	0.000	0.03675
2800.00	3.5714	1.470	0.000	0.008	0.000	0.03680
2820.00	3.5461	1.470	0.000	0.008	0.000	0.03680
2840.00	3.5211	1.470	0.000	0.008	0.000	0.03685
2860.00	3.4965	1.470	0.000	0.008	0.000	0.03685
2880.00	3.4722	1.470	0.000	0.008	0.000	0.03690
2900.00	3.4483	1.470	0.000	0.008	0.000	0.03690
2920.00	3.4247	1.471	0.000	0.008	0.000	0.03695
2940.00	3.4014	1.471	0.000	0.008	0.000	0.03695
2960.00	3.3784	1.471	0.000	0.008	0.000	0.03700
2980.00	3.3557	1.471	0.000	0.008	0.000	0.03700
3000.00	3.3333	1.471	0.000	0.008	0.000	0.03700
3020.00	3.3113	1.471	0.000	0.008	0.000	0.03700
3040.00	3.2895	1.472	0.000	0.008	0.000	0.03705



Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 4

WN	WL	N	K	DN	DK	R
3060.00	3.2680	1.472	0.000	0.008	0.000	0.03705
3080.00	3.2468	1.472	0.000	0.008	0.000	0.03705
3100.00	3.2258	1.472	0.000	0.008	0.000	0.03705
3120.00	3.2051	1.472	0.000	0.008	0.000	0.03705
3140.00	3.1847	1.471	0.000	0.008	0.000	0.03700
3160.00	3.1646	1.471	0.000	0.008	0.000	0.03700
3180.00	3.1447	1.471	0.000	0.008	0.000	0.03700
3200.00	3.1250	1.471	0.000	0.008	0.000	0.03700
3220.00	3.1056	1.471	0.000	0.008	0.000	0.03700
3240.00	3.0864	1.471	0.000	0.008	0.000	0.03700
3260.00	3.0675	1.472	0.000	0.008	0.000	0.03705
3280.00	3.0488	1.472	0.000	0.008	0.000	0.03705
3300.00	3.0303	1.472	0.000	0.008	0.000	0.03705
3320.00	3.0120	1.472	0.000	0.008	0.000	0.03705
3340.00	2.9940	1.472	0.000	0.008	0.000	0.03705
3360.00	2.9762	1.472	0.000	0.008	0.000	0.03705
3380.00	2.9586	1.472	0.000	0.008	0.000	0.03710
3400.00	2.9412	1.472	0.000	0.008	0.000	0.03710
3420.00	2.9240	1.472	0.000	0.008	0.000	0.03710
3440.00	2.9070	1.472	0.000	0.008	0.000	0.03710
3460.00	2.8902	1.472	0.000	0.008	0.000	0.03710
3480.00	2.8736	1.472	0.000	0.008	0.000	0.03715
3500.00	2.8571	1.472	0.000	0.008	0.000	0.03715
3520.00	2.8409	1.472	0.000	0.008	0.000	0.03715
3540.00	2.8249	1.472	0.000	0.008	0.000	0.03715
3560.00	2.8090	1.472	0.000	0.008	0.000	0.03715
3580.00	2.7933	1.473	0.000	0.008	0.000	0.03720
3600.00	2.7778	1.473	0.000	0.008	0.000	0.03720
3620.00	2.7624	1.473	0.000	0.008	0.000	0.03720
3640.00	2.7473	1.473	0.000	0.008	0.000	0.03725
3660.00	2.7322	1.473	0.000	0.008	0.000	0.03725
3680.00	2.7174	1.473	0.000	0.008	0.000	0.03725
3700.00	2.7027	1.474	0.000	0.008	0.000	0.03730
3720.00	2.6882	1.474	0.000	0.008	0.000	0.03730
3740.00	2.6738	1.474	0.000	0.008	0.000	0.03735
3760.00	2.6596	1.474	0.000	0.008	0.000	0.03735
3780.00	2.6455	1.474	0.000	0.008	0.000	0.03740
3800.00	2.6316	1.474	0.000	0.008	0.000	0.03740
3820.00	2.6178	1.474	0.000	0.008	0.000	0.03740
3840.00	2.6042	1.475	0.000	0.008	0.000	0.03745
3860.00	2.5907	1.475	0.000	0.008	0.000	0.03745
3880.00	2.5773	1.475	0.000	0.008	0.000	0.03745
3900.00	2.5641	1.475	0.000	0.008	0.000	0.03745
3920.00	2.5510	1.475	0.000	0.008	0.000	0.03745
3940.00	2.5381	1.475	0.000	0.008	0.000	0.03750
3960.00	2.5253	1.475	0.000	0.008	0.000	0.03750
3980.00	2.5126	1.475	0.000	0.008	0.000	0.03750
4000.00	2.5000	1.475	0.000	0.008	0.000	0.03750
4032.26	2.4800	1.474	0.000	0.008	0.000	0.03735
4065.04	2.4600	1.474	0.000	0.008	0.000	0.03735

Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 5

WN	WL	N	K	DN	DK	R
4098.36	2.4400	1.474	0.000	0.008	0.000	0.03730
4132.23	2.4200	1.474	0.000	0.008	0.000	0.03730
4166.67	2.4000	1.474	0.000	0.008	0.000	0.03730
4201.68	2.3800	1.473	0.000	0.008	0.000	0.03725
4237.29	2.3600	1.473	0.000	0.008	0.000	0.03725
4273.50	2.3400	1.473	0.000	0.008	0.000	0.03725
4310.35	2.3200	1.474	0.000	0.008	0.000	0.03730
4347.83	2.3000	1.474	0.000	0.008	0.000	0.03730
4385.96	2.2800	1.474	0.000	0.008	0.000	0.03730
4424.78	2.2600	1.474	0.000	0.008	0.000	0.03735
4464.29	2.2400	1.475	0.000	0.008	0.000	0.03750
4504.50	2.2200	1.475	0.000	0.008	0.000	0.03750
4545.45	2.2000	1.476	0.000	0.008	0.000	0.03755
4587.16	2.1800	1.476	0.000	0.008	0.000	0.03760
4629.63	2.1600	1.476	0.000	0.008	0.000	0.03765
4672.90	2.1400	1.477	0.000	0.008	0.000	0.03775
4716.98	2.1200	1.478	0.000	0.008	0.000	0.03780
4761.90	2.1000	1.478	0.000	0.008	0.000	0.03785
4807.69	2.0800	1.479	0.000	0.008	0.000	0.03795
4854.37	2.0600	1.479	0.000	0.008	0.000	0.03800
4901.96	2.0400	1.479	0.000	0.008	0.000	0.03800
4950.50	2.0200	1.479	0.000	0.008	0.000	0.03805
5000.00	2.0000	1.479	0.000	0.008	0.000	0.03805
5050.50	1.9800	1.479	0.000	0.008	0.000	0.03805
5102.04	1.9600	1.479	0.000	0.008	0.000	0.03805
5154.64	1.9400	1.479	0.000	0.008	0.000	0.03805
5208.33	1.9200	1.479	0.000	0.008	0.000	0.03800
5263.16	1.9000	1.479	0.000	0.008	0.000	0.03800
5319.15	1.8800	1.479	0.000	0.008	0.000	0.03800
5376.34	1.8600	1.479	0.000	0.008	0.000	0.03800
5434.73	1.8400	1.479	0.000	0.008	0.000	0.03795
5494.50	1.8200	1.479	0.000	0.008	0.000	0.03795
5555.56	1.8000	1.479	0.000	0.008	0.000	0.03795
5617.98	1.7800	1.479	0.000	0.008	0.000	0.03795
5681.82	1.7600	1.478	0.000	0.008	0.000	0.03785
5747.13	1.7400	1.478	0.000	0.008	0.000	0.03785
5813.95	1.7200	1.478	0.000	0.008	0.000	0.03785
5882.35	1.7000	1.478	0.000	0.008	0.000	0.03785
5952.38	1.6800	1.478	0.000	0.008	0.000	0.03780
6024.10	1.6600	1.478	0.000	0.008	0.000	0.03780
6097.56	1.6400	1.478	0.000	0.008	0.000	0.03785
6172.34	1.6200	1.478	0.000	0.008	0.000	0.03785
6250.00	1.6000	1.478	0.000	0.008	0.000	0.03785
6329.11	1.5800	1.478	0.000	0.008	0.000	0.03785
6410.26	1.5600	1.479	0.000	0.008	0.000	0.03795
6493.51	1.5400	1.479	0.000	0.008	0.000	0.03795
6578.95	1.5200	1.479	0.000	0.008	0.000	0.03795
6666.67	1.5000	1.479	0.000	0.008	0.000	0.03795
6756.76	1.4800	1.479	0.000	0.008	0.000	0.03795
6849.31	1.4600	1.479	0.000	0.008	0.000	0.03795

Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 6

WN	WL	N	K	DN	DK	R
6944.44	1.4400	1.479	0.000	0.008	0.000	0.03795
7042.25	1.4200	1.479	0.000	0.008	0.000	0.03795
7142.86	1.4000	1.479	0.000	0.008	0.000	0.03795
7246.38	1.3800	1.479	0.000	0.008	0.000	0.03795
7352.94	1.3600	1.479	0.000	0.008	0.000	0.03795
7462.69	1.3400	1.479	0.000	0.008	0.000	0.03795
7575.76	1.3200	1.479	0.000	0.008	0.000	0.03795
7692.31	1.3000	1.479	0.000	0.008	0.000	0.03795
7812.50	1.2800	1.479	0.000	0.008	0.000	0.03795
7936.51	1.2600	1.478	0.000	0.008	0.000	0.03785
8064.52	1.2400	1.478	0.000	0.008	0.000	0.03785
8196.72	1.2200	1.479	0.000	0.008	0.000	0.03795
8333.33	1.2000	1.479	0.000	0.008	0.000	0.03795
8474.58	1.1800	1.479	0.000	0.008	0.000	0.03795
8620.69	1.1600	1.479	0.000	0.008	0.000	0.03795
8771.93	1.1400	1.479	0.000	0.008	0.000	0.03795
8928.57	1.1200	1.479	0.000	0.008	0.000	0.03795
9090.91	1.1000	1.479	0.000	0.008	0.000	0.03795
9259.26	1.0800	1.479	0.000	0.008	0.000	0.03795
9433.96	1.0600	1.479	0.000	0.008	0.000	0.03795
9615.38	1.0400	1.479	0.000	0.008	0.000	0.03795
9803.92	1.0200	1.479	0.000	0.008	0.000	0.03795
10000.00	1.0000	1.479	0.000	0.008	0.000	0.03795
10204.08	0.9800	1.479	0.000	0.008	0.000	0.03795
10416.67	0.9600	1.479	0.000	0.008	0.000	0.03795
10638.30	0.9400	1.479	0.000	0.008	0.000	0.03795
10869.56	0.9200	1.479	0.000	0.008	0.000	0.03795
11111.11	0.9000	1.479	0.000	0.008	0.000	0.03795
11363.64	0.8800	1.479	0.000	0.008	0.000	0.03795
11627.91	0.8600	1.479	0.000	0.008	0.000	0.03795
11904.76	0.8400	1.479	0.000	0.008	0.000	0.03795
12195.12	0.8200	1.479	0.000	0.008	0.000	0.03795
12500.00	0.8000	1.479	0.000	0.008	0.000	0.03795
12820.51	0.7800	1.479	0.000	0.008	0.000	0.03795
13157.89	0.7600	1.479	0.000	0.008	0.000	0.03795
13513.51	0.7400	1.479	0.000	0.008	0.000	0.03795
13888.89	0.7200	1.479	0.000	0.008	0.000	0.03795
14285.71	0.7000	1.479	0.000	0.008	0.000	0.03795
14705.88	0.6800	1.479	0.000	0.008	0.000	0.03795
15151.51	0.6600	1.479	0.000	0.008	0.000	0.03795
15625.00	0.6400	1.479	0.000	0.008	0.000	0.03795
16129.03	0.6200	1.479	0.000	0.008	0.000	0.03795
16666.67	0.6000	1.479	0.000	0.008	0.000	0.03800
17241.38	0.5800	1.481	0.000	0.008	0.000	0.03820
17857.14	0.5600	1.482	0.000	0.008	0.000	0.03835
18518.52	0.5400	1.483	0.000	0.008	0.000	0.03845
19230.77	0.5200	1.484	0.000	0.008	0.000	0.03860
20000.00	0.5000	1.485	0.000	0.008	0.000	0.03875
20833.33	0.4800	1.486	0.000	0.008	0.000	0.03890
21739.13	0.4600	1.487	0.000	0.008	0.000	0.03905

Table 5. Barium Fluoride (BaF<sub>2</sub>).

PAGE 7

WN	WL	N	K	DN	DK	R
22727.27	0.4400	1.489	0.000	0.008	0.000	0.03930
23809.52	0.4200	1.491	0.000	0.008	0.000	0.03950
25000.00	0.4000	1.493	0.000	0.008	0.000	0.03980
26315.79	0.3800	1.495	0.000	0.008	0.000	0.04010
27777.78	0.3600	1.499	0.000	0.008	0.000	0.04055
29411.76	0.3400	1.503	0.000	0.008	0.000	0.04105
31250.00	0.3200	1.506	0.000	0.008	0.000	0.04150
33333.33	0.3000	1.510	0.000	0.008	0.000	0.04195
35714.29	0.2800	1.516	0.000	0.008	0.000	0.04280
38461.54	0.2600	1.526	0.000	0.008	0.000	0.04405
41666.67	0.2400	1.540	0.000	0.008	0.000	0.04500
45454.55	0.2200	1.533	0.000	0.008	0.000	0.04505

#### 4.6 Zinc Sulfide (ZnS).

The zinc sulfide used for this investigation was a high purity optically isotropic sample that was manufactured by Raytheon Research Division, Advanced Materials Department, Lexington, Ma. 02173 by use of a chemical vapor deposition process. The sample was selected from 2 pounds of zinc sulfide fragments and measured approximately 1 inch dia. x 0.5 inch thick.

The sample was prepared for reflectance measurements using a procedure similar to that described in Sec. 4.5 for barium fluoride. The reflectance spectrum of ZnS was acquired in a manner similar to that described in Secs. 4.1, 4.2, or 4.3. The reflectance spectrum is presented in graphical form in Figures 11 and 12.

Complex refractive index  $n+ik$  spectra were determined by applying Kramers-Kronig methods to the reflectance spectrum. For this purpose the reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $0\text{ cm}^{-1}$  by use of classical dispersion theory parameters previously tabulated by H.H. Li,<sup>7</sup> and was extended from 200 nm to 20 nm using reflectance spectra previously measured by Hunter et al.<sup>8</sup> and Cardona and G. Harbeke.<sup>9</sup> The data in Ref. 9 was for hexagonal ZnS so we relied more heavily on the data from Ref. 8. Spectral values of  $n$  and  $k$  are presented in graphical form in Figures 11 and 12 and in tabular form in Table 6.

# ZINC SULFIDE

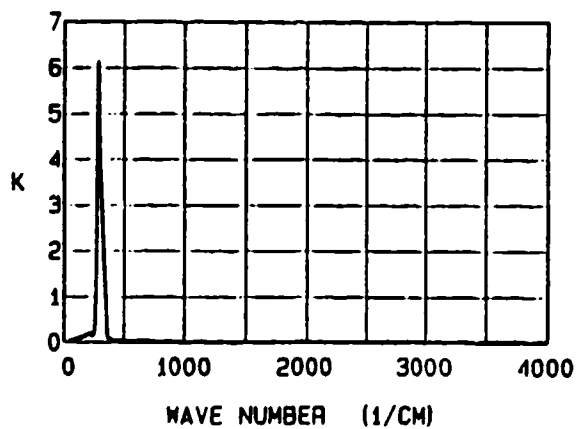
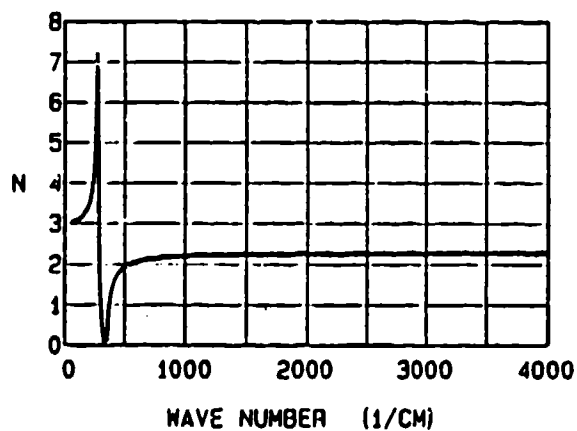
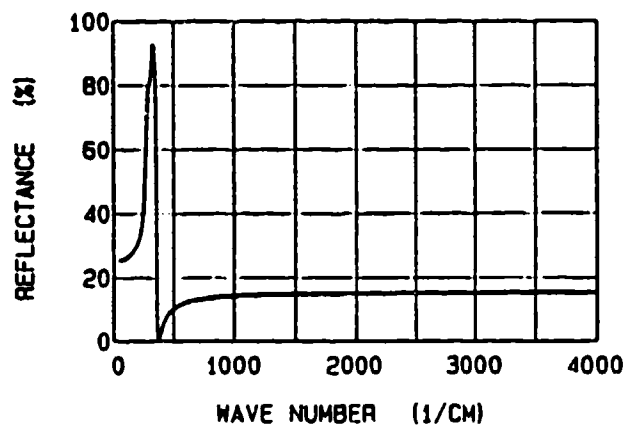


Figure 11. The infrared ( $60\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for zinc sulfide.

# ZINC SULFIDE

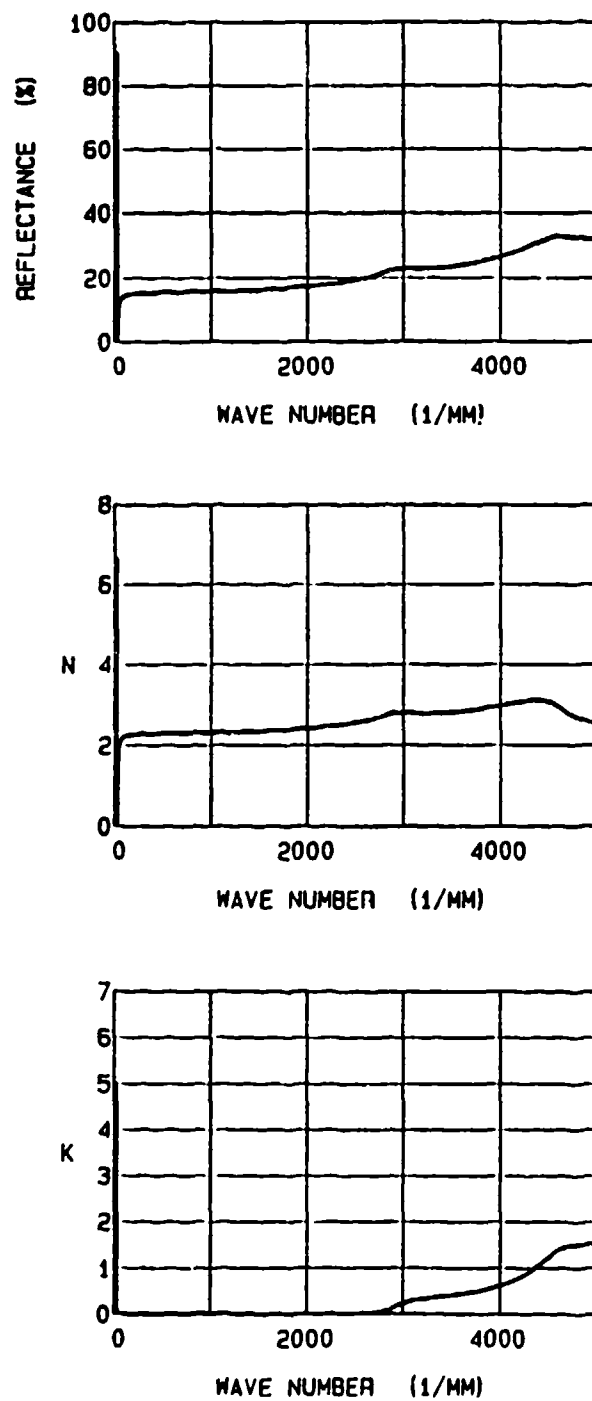


Figure 12. The uv-vis-nir ( $60\text{--}4,000\text{ nm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for zinc sulfide .

Table 6. Zinc Sulfide (ZnS).

PAGE 1

WN	WL	N	K	DN	DK	R
60.00	166.6667	3.008	0.036	0.010	0.036	0.25320
80.00	125.0000	3.029	0.049	0.010	0.049	0.25585
100.00	100.0000	3.058	0.063	0.011	0.059	0.25950
120.00	83.3333	3.097	0.079	0.012	0.061	0.26445
140.00	71.4286	3.150	0.098	0.013	0.063	0.27105
160.00	62.5000	3.223	0.120	0.014	0.066	0.27985
180.00	55.5556	3.324	0.151	0.016	0.071	0.29195
200.00	50.0000	3.465	0.173	0.017	0.078	0.30806
220.00	45.4545	3.709	0.171	0.019	0.090	0.33410
240.00	41.6667	4.347	0.153	0.021	0.126	0.39460
260.00	38.4615	6.369	1.269	0.131	0.274	0.54650
280.00	35.7143	2.653	5.788	0.225	0.203	0.77480
300.00	33.3333	0.702	3.451	0.038	0.089	0.81155
320.00	31.2500	0.107	2.072	0.005	0.037	0.92320
340.00	29.4118	0.093	0.944	0.002	0.013	0.82440
360.00	27.7778	0.865	0.097	0.009	0.007	0.00815
380.00	26.3158	1.296	0.066	0.011	0.007	0.01775
400.00	25.0000	1.507	0.048	0.009	0.010	0.04195
420.00	23.8095	1.648	0.037	0.008	0.013	0.06095
440.00	22.7273	1.751	0.028	0.008	0.015	0.07570
460.00	21.7391	1.828	0.027	0.008	0.017	0.08700
480.00	20.8333	1.883	0.029	0.008	0.018	0.09525
500.00	20.0000	1.923	0.026	0.007	0.019	0.10115
520.00	19.2308	1.960	0.018	0.007	0.018	0.10655
540.00	18.5185	1.995	0.016	0.007	0.016	0.11185
560.00	17.8571	2.021	0.017	0.007	0.017	0.11575
580.00	17.2414	2.042	0.019	0.007	0.019	0.11885
600.00	16.6667	2.059	0.019	0.007	0.019	0.12135
620.00	16.1290	2.074	0.018	0.007	0.018	0.12360
640.00	15.6250	2.086	0.017	0.007	0.017	0.12545
660.00	15.1515	2.097	0.016	0.007	0.016	0.12705
680.00	14.7059	2.107	0.014	0.007	0.014	0.12845
700.00	14.2857	2.116	0.012	0.007	0.012	0.12985
720.00	13.8889	2.125	0.010	0.007	0.010	0.13115
740.00	13.5135	2.133	0.007	0.007	0.007	0.13235
760.00	13.1579	2.141	0.006	0.007	0.006	0.13360
780.00	12.8205	2.149	0.006	0.007	0.006	0.13470
800.00	12.5000	2.155	0.005	0.007	0.005	0.13565
820.00	12.1951	2.161	0.004	0.007	0.004	0.13655
840.00	11.9048	2.167	0.004	0.007	0.004	0.13735
860.00	11.6279	2.172	0.003	0.007	0.003	0.13810
880.00	11.3536	2.176	0.003	0.007	0.003	0.13875
900.00	11.1111	2.180	0.002	0.007	0.002	0.13940
920.00	10.8696	2.185	0.002	0.007	0.002	0.14005
940.00	10.6383	2.189	0.002	0.007	0.002	0.14065
960.00	10.4167	2.192	0.002	0.007	0.002	0.14115
980.00	10.2041	2.196	0.002	0.007	0.002	0.14165
1000.00	10.0000	2.199	0.002	0.007	0.002	0.14210
1020.00	9.8039	2.201	0.002	0.007	0.002	0.14250
1040.00	9.6154	2.204	0.003	0.007	0.003	0.14290



Table 6. Zinc Sulfide (ZnS).

PAGE 2

WN	WL	N	K	DN	DK	R
1060.00	9.4340	2.207	0.003	0.007	0.003	0.14325
1080.00	9.2593	2.209	0.003	0.007	0.003	0.14360
1100.00	9.0909	2.211	0.003	0.007	0.003	0.14390
1120.00	8.9286	2.213	0.003	0.007	0.003	0.14415
1140.00	8.7719	2.214	0.003	0.007	0.003	0.14440
1160.00	8.6207	2.216	0.003	0.007	0.003	0.14465
1180.00	8.4746	2.217	0.004	0.007	0.004	0.14485
1200.00	8.3333	2.219	0.004	0.007	0.004	0.14505
1220.00	8.1967	2.220	0.004	0.007	0.004	0.14525
1240.00	8.0645	2.221	0.003	0.007	0.003	0.14540
1260.00	7.9365	2.223	0.003	0.007	0.003	0.14560
1280.00	7.8125	2.224	0.003	0.007	0.003	0.14575
1300.00	7.6923	2.225	0.003	0.007	0.003	0.14590
1320.00	7.5758	2.226	0.003	0.007	0.003	0.14605
1340.00	7.4627	2.227	0.003	0.007	0.003	0.14620
1360.00	7.3529	2.228	0.003	0.007	0.003	0.14635
1380.00	7.2464	2.229	0.003	0.007	0.003	0.14650
1400.00	7.1429	2.229	0.003	0.007	0.003	0.14660
1420.00	7.0423	2.230	0.003	0.007	0.003	0.14675
1440.00	6.9444	2.231	0.003	0.007	0.003	0.14685
1460.00	6.8493	2.232	0.002	0.007	0.002	0.14695
1480.00	6.7568	2.232	0.002	0.007	0.002	0.14705
1500.00	6.6667	2.233	0.002	0.007	0.002	0.14715
1520.00	6.5789	2.234	0.002	0.007	0.002	0.14725
1540.00	6.4935	2.234	0.002	0.007	0.002	0.14735
1560.00	6.4103	2.235	0.002	0.007	0.002	0.14740
1580.00	6.3291	2.235	0.001	0.007	0.001	0.14750
1600.00	6.2500	2.236	0.001	0.007	0.001	0.14760
1620.00	6.1728	2.236	0.001	0.007	0.001	0.14765
1640.00	6.0976	2.237	0.001	0.007	0.001	0.14775
1660.00	6.0241	2.238	0.000	0.007	0.000	0.14785
1680.00	5.9524	2.239	0.000	0.007	0.000	0.14795
1700.00	5.8824	2.239	0.000	0.007	0.000	0.14805
1720.00	5.8140	2.240	0.000	0.007	0.000	0.14815
1740.00	5.7471	2.241	0.000	0.007	0.001	0.14830
1760.00	5.6818	2.242	0.000	0.007	0.001	0.14840
1780.00	5.6180	2.242	0.000	0.007	0.001	0.14850
1800.00	5.5556	2.243	0.000	0.007	0.001	0.14860
1820.00	5.4945	2.244	0.000	0.007	0.001	0.14870
1840.00	5.4348	2.244	0.000	0.007	0.001	0.14880
1860.00	5.3763	2.245	0.000	0.007	0.001	0.14890
1880.00	5.3191	2.246	0.000	0.007	0.000	0.14900
1900.00	5.2632	2.246	0.000	0.007	0.000	0.14905
1920.00	5.2083	2.246	0.000	0.007	0.000	0.14910
1940.00	5.1546	2.247	0.000	0.007	0.000	0.14915
1960.00	5.1020	2.247	0.001	0.007	0.001	0.14920
1980.00	5.0505	2.247	0.001	0.007	0.001	0.14925
2000.00	5.0000	2.248	0.001	0.007	0.001	0.14930
2020.00	4.9505	2.248	0.000	0.007	0.000	0.14935
2040.00	4.9020	2.248	0.000	0.007	0.000	0.14940

Table 6. Zinc Sulfide (ZnS).

PAGE 3

WN	WL	N	K	DN	DK	R
2060.00	4.8544	2.249	0.000	0.007	0.000	0.14945
2080.00	4.8077	2.249	0.001	0.007	0.001	0.14950
2100.00	4.7619	2.249	0.001	0.007	0.001	0.14950
2120.00	4.7170	2.249	0.001	0.007	0.001	0.14955
2140.00	4.6729	2.250	0.001	0.007	0.001	0.14960
2160.00	4.6296	2.250	0.001	0.007	0.001	0.14965
2180.00	4.5872	2.250	0.001	0.007	0.001	0.14965
2200.00	4.5455	2.250	0.001	0.007	0.001	0.14965
2220.00	4.5045	2.250	0.001	0.007	0.001	0.14970
2240.00	4.4643	2.250	0.001	0.007	0.001	0.14970
2260.00	4.4248	2.251	0.001	0.007	0.001	0.14975
2280.00	4.3860	2.251	0.001	0.007	0.001	0.14980
2300.00	4.3478	2.251	0.000	0.007	0.000	0.14985
2320.00	4.3103	2.252	0.000	0.007	0.000	0.14990
2340.00	4.2735	2.252	0.000	0.007	0.000	0.14990
2360.00	4.2373	2.252	0.000	0.007	0.000	0.14995
2380.00	4.2017	2.253	0.000	0.007	0.000	0.15000
2400.00	4.1667	2.253	0.000	0.007	0.000	0.15010
2420.00	4.1322	2.254	0.000	0.007	0.000	0.15015
2440.00	4.0984	2.254	0.000	0.007	0.000	0.15020
2460.00	4.0650	2.254	0.000	0.007	0.000	0.15025
2480.00	4.0323	2.255	0.000	0.007	0.000	0.15030
2500.00	4.0000	2.255	0.000	0.007	0.000	0.15035
2520.00	3.9683	2.255	0.000	0.007	0.000	0.15040
2540.00	3.9370	2.256	0.000	0.007	0.000	0.15045
2560.00	3.9063	2.256	0.000	0.007	0.000	0.15050
2580.00	3.8760	2.256	0.001	0.007	0.001	0.15050
2600.00	3.8462	2.256	0.001	0.007	0.001	0.15050
2620.00	3.8168	2.256	0.001	0.007	0.001	0.15055
2640.00	3.7879	2.256	0.001	0.007	0.001	0.15055
2660.00	3.7594	2.257	0.001	0.007	0.001	0.15060
2680.00	3.7313	2.257	0.001	0.007	0.001	0.15060
2700.00	3.7037	2.257	0.001	0.007	0.001	0.15060
2720.00	3.6765	2.257	0.001	0.007	0.001	0.15065
2740.00	3.6496	2.257	0.001	0.007	0.001	0.15065
2760.00	3.6232	2.257	0.001	0.007	0.001	0.15070
2780.00	3.5971	2.257	0.001	0.007	0.001	0.15070
2800.00	3.5714	2.258	0.001	0.007	0.001	0.15075
2820.00	3.5461	2.258	0.001	0.007	0.001	0.15075
2840.00	3.5211	2.258	0.001	0.007	0.001	0.15080
2860.00	3.4965	2.258	0.001	0.007	0.001	0.15080
2880.00	3.4722	2.258	0.001	0.007	0.001	0.15080
2900.00	3.4483	2.258	0.001	0.007	0.001	0.15085
2920.00	3.4247	2.258	0.001	0.007	0.001	0.15085
2940.00	3.4014	2.259	0.001	0.007	0.001	0.15090
2960.00	3.3784	2.259	0.001	0.007	0.001	0.15090
2980.00	3.3557	2.259	0.001	0.007	0.001	0.15095
3000.00	3.3333	2.259	0.001	0.007	0.001	0.15095
3020.00	3.3113	2.259	0.001	0.007	0.001	0.15095
3040.00	3.2895	2.259	0.001	0.007	0.001	0.15100

Table 6. Zinc Sulfide (ZnS).

PAGE 4

WN	WL	N	K	DN	DK	R
3060.00	3.2680	2.259	0.001	0.007	0.001	0.15100
3080.00	3.2468	2.260	0.000	0.007	0.000	0.15105
3100.00	3.2258	2.260	0.001	0.007	0.001	0.15105
3120.00	3.2051	2.260	0.000	0.007	0.000	0.15110
3140.00	3.1847	2.260	0.001	0.007	0.001	0.15110
3160.00	3.1646	2.260	0.001	0.007	0.001	0.15115
3180.00	3.1447	2.260	0.001	0.007	0.001	0.15115
3200.00	3.1250	2.261	0.001	0.007	0.001	0.15120
3220.00	3.1056	2.261	0.000	0.007	0.000	0.15125
3240.00	3.0864	2.261	0.000	0.007	0.000	0.15125
3260.00	3.0675	2.261	0.001	0.007	0.001	0.15130
3280.00	3.0488	2.261	0.000	0.007	0.000	0.15130
3300.00	3.0303	2.262	0.000	0.007	0.000	0.15135
3320.00	3.0120	2.262	0.000	0.007	0.000	0.15135
3340.00	2.9940	2.262	0.000	0.007	0.000	0.15140
3360.00	2.9762	2.262	0.000	0.007	0.000	0.15145
3380.00	2.9586	2.262	0.000	0.007	0.000	0.15145
3400.00	2.9412	2.263	0.000	0.007	0.000	0.15150
3420.00	2.9240	2.263	0.000	0.007	0.000	0.15150
3440.00	2.9070	2.263	0.000	0.007	0.000	0.15155
3460.00	2.8902	2.263	0.000	0.007	0.000	0.15160
3480.00	2.8736	2.263	0.000	0.007	0.000	0.15160
3500.00	2.8571	2.264	0.000	0.007	0.000	0.15165
3520.00	2.8409	2.264	0.000	0.007	0.000	0.15170
3540.00	2.8249	2.264	0.000	0.007	0.000	0.15175
3560.00	2.8090	2.265	0.000	0.007	0.000	0.15180
3580.00	2.7933	2.265	0.000	0.007	0.000	0.15185
3600.00	2.7778	2.266	0.000	0.007	0.000	0.15190
3620.00	2.7624	2.266	0.000	0.007	0.000	0.15195
3640.00	2.7473	2.266	0.000	0.007	0.000	0.15200
3660.00	2.7322	2.267	0.000	0.007	0.000	0.15205
3680.00	2.7174	2.267	0.000	0.007	0.000	0.15210
3700.00	2.7027	2.267	0.001	0.007	0.001	0.15210
3720.00	2.6882	2.267	0.001	0.007	0.001	0.15215
3740.00	2.6738	2.268	0.001	0.007	0.001	0.15220
3760.00	2.6596	2.268	0.001	0.007	0.001	0.15220
3780.00	2.6455	2.268	0.001	0.007	0.001	0.15220
3800.00	2.6316	2.268	0.002	0.007	0.002	0.15225
3820.00	2.6178	2.268	0.002	0.007	0.002	0.15225
3840.00	2.6042	2.268	0.002	0.007	0.002	0.15225
3860.00	2.5907	2.268	0.002	0.007	0.002	0.15225
3880.00	2.5773	2.268	0.002	0.007	0.002	0.15225
3900.00	2.5641	2.268	0.002	0.007	0.002	0.15225
3920.00	2.5510	2.268	0.002	0.007	0.002	0.15225
3940.00	2.5381	2.268	0.002	0.007	0.002	0.15225
3960.00	2.5253	2.268	0.002	0.007	0.002	0.15225
3980.00	2.5126	2.268	0.002	0.007	0.002	0.15225
4000.00	2.5000	2.268	0.003	0.007	0.003	0.15225
4032.26	2.4800	2.268	0.000	0.007	0.011	0.15225
4065.04	2.4600	2.268	0.000	0.007	0.012	0.15235

Table 6. Zinc Sulfide (ZnS).

PAGE 5

WN	WL	N	K	DN	DK	R
4098.36	2.4400	2.269	0.000	0.007	0.013	0.15245
4132.23	2.4200	2.270	0.000	0.007	0.013	0.15255
4166.67	2.4000	2.271	0.000	0.007	0.013	0.15265
4201.68	2.3800	2.271	0.000	0.007	0.014	0.15275
4237.29	2.3600	2.272	0.000	0.007	0.014	0.15290
4273.50	2.3400	2.273	0.000	0.007	0.014	0.15305
4310.35	2.3200	2.274	0.000	0.007	0.014	0.15320
4347.83	2.3000	2.275	0.000	0.007	0.014	0.15330
4385.96	2.2800	2.276	0.000	0.007	0.013	0.15345
4424.78	2.2600	2.276	0.000	0.007	0.013	0.15350
4464.29	2.2400	2.277	0.000	0.007	0.013	0.15360
4504.50	2.2200	2.277	0.000	0.007	0.012	0.15365
4545.45	2.2000	2.278	0.000	0.007	0.012	0.15375
4587.16	2.1800	2.278	0.000	0.007	0.012	0.15380
4629.63	2.1600	2.279	0.000	0.007	0.012	0.15390
4672.90	2.1400	2.280	0.000	0.007	0.012	0.15400
4716.98	2.1200	2.280	0.000	0.007	0.012	0.15405
4761.90	2.1000	2.281	0.000	0.007	0.012	0.15420
4807.69	2.0800	2.283	0.000	0.007	0.012	0.15440
4854.37	2.0600	2.284	0.000	0.007	0.011	0.15455
4901.96	2.0400	2.284	0.000	0.007	0.010	0.15465
4950.50	2.0200	2.285	0.000	0.007	0.009	0.15475
5000.00	2.0000	2.285	0.000	0.007	0.008	0.15480
5050.50	1.9800	2.286	0.000	0.007	0.008	0.15490
5102.04	1.9600	2.286	0.000	0.007	0.006	0.15495
5154.64	1.9400	2.287	0.000	0.007	0.006	0.15500
5208.33	1.9200	2.287	0.000	0.007	0.005	0.15505
5263.16	1.9000	2.287	0.000	0.007	0.004	0.15510
5319.15	1.8800	2.287	0.000	0.007	0.003	0.15510
5376.34	1.8600	2.287	0.000	0.007	0.002	0.15505
5434.78	1.8400	2.287	0.000	0.007	0.001	0.15500
5494.50	1.8200	2.286	0.000	0.007	0.001	0.15495
5555.56	1.8000	2.286	0.000	0.007	0.001	0.15495
5617.98	1.7800	2.286	0.000	0.007	0.001	0.15495
5681.82	1.7600	2.286	0.000	0.007	0.000	0.15495
5747.13	1.7400	2.286	0.000	0.007	0.000	0.15490
5813.95	1.7200	2.286	0.000	0.007	0.000	0.15490
5882.35	1.7000	2.286	0.000	0.007	0.000	0.15490
5952.38	1.6800	2.286	0.000	0.007	0.000	0.15490
6024.10	1.6600	2.286	0.000	0.007	0.000	0.15495
6097.56	1.6400	2.287	0.000	0.007	0.000	0.15505
6172.84	1.6200	2.288	0.000	0.007	0.000	0.15515
6250.00	1.6000	2.288	0.000	0.007	0.000	0.15525
6329.11	1.5800	2.289	0.001	0.007	0.001	0.15530
6410.26	1.5600	2.289	0.001	0.007	0.001	0.15535
6493.51	1.5400	2.289	0.001	0.007	0.001	0.15540
6578.95	1.5200	2.290	0.002	0.007	0.002	0.15545
6666.67	1.5000	2.290	0.002	0.007	0.002	0.15550
6756.76	1.4800	2.291	0.002	0.007	0.002	0.15560
6849.31	1.4600	2.291	0.003	0.007	0.003	0.15565

Table 6. Zinc Sulfide (ZnS).

PAGE 6

WN	WL	N	K	DN	DK	R
6944.44	1.4400	2.291	0.004	0.007	0.004	0.15565
7042.25	1.4200	2.292	0.004	0.007	0.004	0.15570
7142.86	1.4000	2.292	0.004	0.007	0.004	0.15570
7246.38	1.3800	2.292	0.004	0.007	0.004	0.15575
7352.94	1.3600	2.293	0.004	0.007	0.004	0.15590
7462.69	1.3400	2.293	0.005	0.007	0.005	0.15595
7575.76	1.3200	2.294	0.005	0.007	0.005	0.15610
7692.31	1.3000	2.295	0.005	0.007	0.005	0.15620
7812.50	1.2800	2.296	0.006	0.007	0.006	0.15630
7936.51	1.2600	2.296	0.007	0.007	0.007	0.15635
8064.52	1.2400	2.297	0.007	0.007	0.007	0.15645
8196.72	1.2200	2.297	0.008	0.007	0.008	0.15650
8333.33	1.2000	2.298	0.009	0.007	0.009	0.15665
8474.58	1.1800	2.298	0.010	0.007	0.010	0.15670
8620.69	1.1600	2.299	0.010	0.007	0.010	0.15680
8771.93	1.1400	2.299	0.012	0.007	0.012	0.15685
8928.57	1.1200	2.299	0.013	0.007	0.013	0.15685
9090.91	1.1000	2.299	0.014	0.007	0.014	0.15685
9259.26	1.0800	2.299	0.014	0.007	0.014	0.15680
9433.96	1.0600	2.299	0.015	0.007	0.015	0.15675
9615.38	1.0400	2.299	0.015	0.007	0.015	0.15675
9803.92	1.0200	2.298	0.016	0.007	0.016	0.15670
10000.00	1.0000	2.298	0.016	0.007	0.016	0.15665
10204.08	0.9800	2.298	0.015	0.007	0.015	0.15670
10416.67	0.9600	2.298	0.014	0.007	0.014	0.15670
10638.30	0.9400	2.299	0.013	0.007	0.013	0.15680
10869.56	0.9200	2.300	0.012	0.007	0.012	0.15695
11111.11	0.9000	2.301	0.012	0.007	0.012	0.15715
11363.64	0.8800	2.303	0.011	0.007	0.011	0.15735
11627.91	0.8600	2.304	0.011	0.007	0.011	0.15755
11904.76	0.8400	2.306	0.010	0.007	0.010	0.15780
12195.12	0.8200	2.308	0.009	0.007	0.009	0.15805
12500.00	0.8000	2.310	0.009	0.007	0.009	0.15840
12820.51	0.7800	2.313	0.008	0.007	0.008	0.15880
13157.89	0.7600	2.316	0.007	0.007	0.007	0.15920
13513.51	0.7400	2.319	0.007	0.007	0.007	0.15965
13888.89	0.7200	2.322	0.006	0.007	0.006	0.16020
14285.71	0.7000	2.327	0.006	0.007	0.006	0.16080
14705.88	0.6800	2.331	0.005	0.007	0.005	0.16140
15151.51	0.6600	2.335	0.005	0.007	0.005	0.16200
15625.00	0.6400	2.341	0.002	0.007	0.002	0.16290
16129.03	0.6200	2.348	0.002	0.007	0.002	0.16385
16666.67	0.6000	2.355	0.002	0.007	0.002	0.16490
17241.38	0.5800	2.363	0.001	0.007	0.001	0.16610
17857.14	0.5600	2.373	0.001	0.007	0.001	0.16755
18518.52	0.5400	2.384	0.000	0.007	0.000	0.16915
19230.77	0.5200	2.397	0.000	0.007	0.000	0.17100
20000.00	0.5000	2.416	0.003	0.007	0.003	0.17360
20833.33	0.4800	2.429	0.001	0.007	0.001	0.17550
21739.13	0.4600	2.451	0.003	0.007	0.003	0.17865

Table 6. Zinc Sulfide (ZnS).

PAGE 7

WN	WL	N	K	DN	DK	R
22727.27	0.4400	2.475	0.003	0.007	0.003	0.18200
23809.52	0.4200	2.508	0.004	0.007	0.004	0.18665
25000.00	0.4000	2.550	0.008	0.008	0.008	0.19260
26315.79	0.3800	2.615	0.015	0.008	0.015	0.20150
27777.78	0.3600	2.710	0.054	0.010	0.045	0.21465
29411.76	0.3400	2.790	0.190	0.015	0.049	0.22710
31250.00	0.3200	2.784	0.299	0.019	0.049	0.22920
33333.33	0.3000	2.774	0.357	0.021	0.048	0.23000
35714.29	0.2800	2.816	0.417	0.024	0.050	0.23775
38461.54	0.2600	2.905	0.523	0.029	0.053	0.25360
41666.67	0.2400	3.044	0.740	0.039	0.058	0.28180
45454.55	0.2200	3.017	1.318	0.061	0.051	0.32710

#### 4.7 Zinc Selenide (ZnSe).

The zinc selenide used for this investigation was a high purity, high clarity, optically isotropic, polycrystalline, chemical vapor deposited sample selected from 5 pounds of ZnSe fragments obtained from Raytheon Research Division, Advanced Materials Department, Lexington, Ma. The sample was approximately  $1 \times 0.625 \times 0.5$  inch<sup>3</sup>.

The ZnSe sample was prepared for reflectance measurements using a procedure similar to that described in Sec. 4.5 for barium fluoride. The reflectance spectrum of ZnSe presented in Figures 13 and 14 was acquired in a manner similar to that described in Secs. 4.1, 4.2, or 4.3.

Complex refractive index  $n+ik$  spectra were obtained by applying a Kramers-Kronig algorithm to the reflectance spectrum. For this purpose the reflectance spectrum was extended from 180 cm<sup>-1</sup> to  $\infty$  cm<sup>-1</sup> using classical dispersion theory parameters previously tabulated by H.H. Li,<sup>7</sup> and from 220 nm to 62 nm using reflectance spectra of ZnSe previously measured by Y. Petroff et al.<sup>10</sup> and Freeouf.<sup>11</sup> This provided apparently unsatisfactory results because the KK analysis gave values of  $k$  in spectral regions where we expected the ZnSe to be transparent.

We therefore measured the transmittance spectrum of a 6.29 mm thick sample of ZnSe. The transmittance spectrum is shown in Figs. 13 and 14. The spectral values of  $n$  and  $k$ , also shown in Figs. 13 and 14, were then computed from the measured

transmittance and reflectance spectra. The values of  $n$  and  $k$  presented in Table 7. Note the absorption bands, probably due to impurities in the ZnSe, at 1040 and 1640  $\text{cm}^{-1}$ .



# ZINC SELENIDE

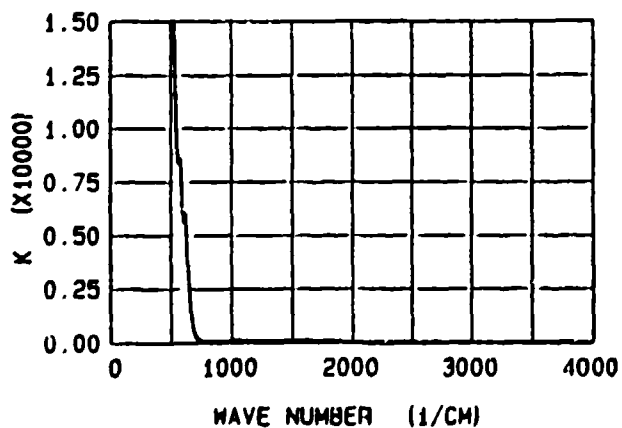
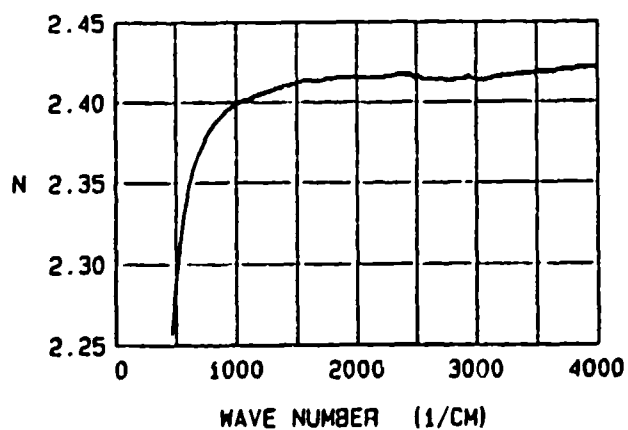
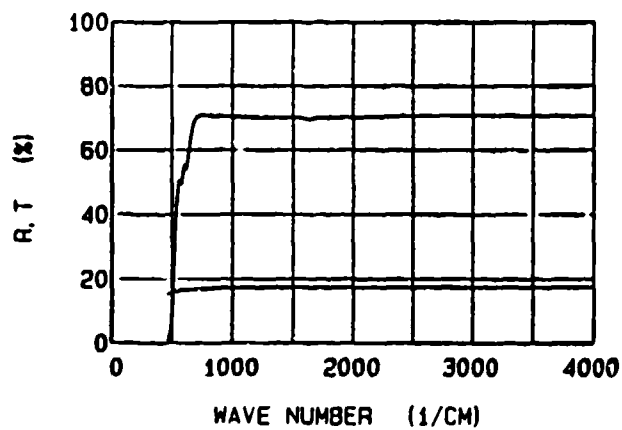


Figure 13. The infrared ( $400\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of zinc selenide .

# ZINC SELENIDE

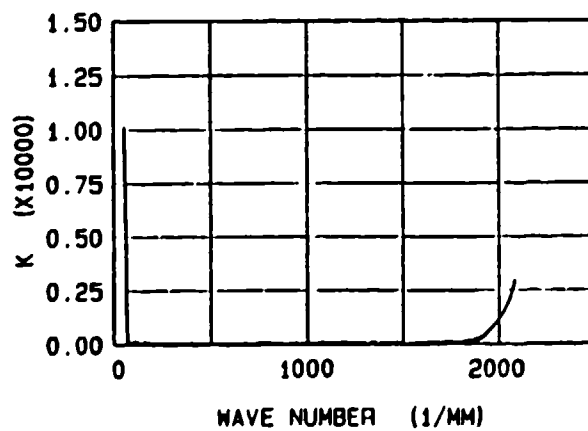
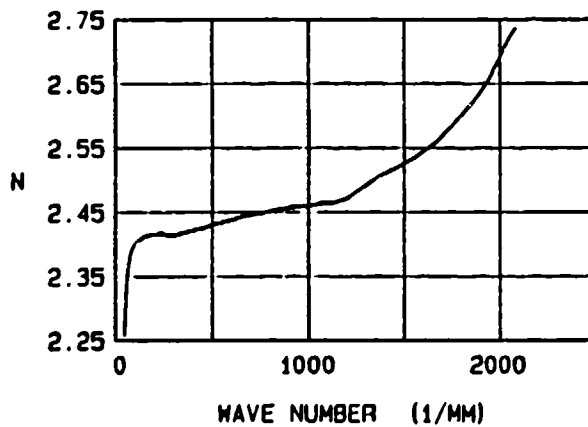
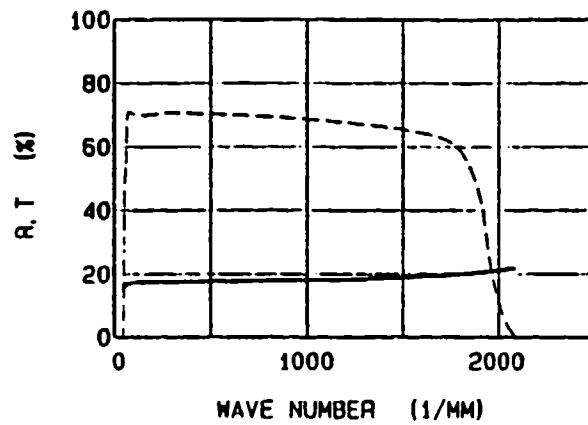


Figure 14. The uv-vis-nir (460-2,000  $\text{nm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K for zinc selenide

Table 7. Zinc Selenide (ZnSe).

PAGE 1

WN	WL	N	K	R
460.00	21.7391	2.257	.0013358	0.15060
480.00	20.8333	2.275	.0007723	0.15326
500.00	20.0000	2.291	.0004232	0.15557
520.00	19.2308	2.304	.0001839	0.15754
540.00	18.5185	2.317	.0001019	0.15936
560.00	17.8571	2.328	.0000839	0.16103
580.00	17.2414	2.337	.0000783	0.16231
600.00	16.6667	2.345	.0000555	0.16345
620.00	16.1290	2.351	.0000560	0.16438
640.00	15.6250	2.357	.0000322	0.16522
660.00	15.1515	2.362	.0000152	0.16591
680.00	14.7059	2.366	.0000068	0.16650
700.00	14.2857	2.369	.0000034	0.16699
720.00	13.8889	2.373	.0000017	0.16748
740.00	13.5135	2.376	.0000011	0.16797
760.00	13.1579	2.379	.0000007	0.16842
780.00	12.8205	2.382	.0000007	0.16881
800.00	12.5000	2.384	.0000008	0.16915
820.00	12.1951	2.387	.0000007	0.16950
840.00	11.9048	2.388	.0000008	0.16970
860.00	11.6279	2.390	.0000008	0.16994
880.00	11.3636	2.392	.0000008	0.17019
900.00	11.1111	2.393	.0000008	0.17043
920.00	10.8696	2.395	.0000008	0.17063
940.00	10.6383	2.395	.0000009	0.17073
960.00	10.4167	2.397	.0000009	0.17088
980.00	10.2041	2.398	.0000009	0.17102
1000.00	10.0000	2.399	.0000009	0.17117
1020.00	9.8039	2.399	.0000011	0.17127
1040.00	9.6154	2.400	.0000011	0.17137
1060.00	9.4340	2.401	.0000010	0.17147
1080.00	9.2593	2.401	.0000010	0.17152
1100.00	9.0909	2.401	.0000011	0.17157
1120.00	8.9286	2.402	.0000010	0.17171
1140.00	8.7719	2.403	.0000010	0.17181
1160.00	8.6207	2.404	.0000009	0.17196
1180.00	8.4746	2.404	.0000009	0.17201
1200.00	8.3333	2.405	.0000009	0.17211
1220.00	8.1967	2.406	.0000009	0.17221
1240.00	8.0645	2.406	.0000008	0.17225
1260.00	7.9365	2.406	.0000009	0.17230
1280.00	7.8125	2.407	.0000009	0.17240
1300.00	7.6923	2.408	.0000008	0.17245
1320.00	7.5758	2.408	.0000008	0.17255
1340.00	7.4627	2.409	.0000008	0.17260
1360.00	7.3529	2.409	.0000008	0.17265
1380.00	7.2464	2.409	.0000008	0.17270
1400.00	7.1429	2.410	.0000008	0.17275
1420.00	7.0423	2.410	.0000007	0.17280
1440.00	6.9444	2.411	.0000008	0.17289

Table 7. Zinc Selenide (ZnSe).

PAGE 2

WN	WL	N	K	R
1460.00	6.8493	2.411	.00000007	0.17294
1480.00	6.7568	2.411	.00000007	0.17299
1500.00	6.6667	2.412	.00000007	0.17304
1520.00	6.5789	2.412	.00000007	0.17314
1540.00	6.4935	2.413	.00000008	0.17319
1560.00	6.4103	2.413	.00000008	0.17319
1580.00	6.3291	2.413	.00000008	0.17324
1600.00	6.2500	2.413	.00000010	0.17329
1620.00	6.1728	2.413	.00000012	0.17329
1640.00	6.0976	2.413	.00000011	0.17329
1660.00	6.0241	2.413	.00000009	0.17329
1680.00	5.9524	2.413	.00000007	0.17329
1700.00	5.8824	2.413	.00000006	0.17329
1720.00	5.8140	2.414	.00000006	0.17334
1740.00	5.7471	2.414	.00000006	0.17334
1760.00	5.6818	2.414	.00000006	0.17339
1780.00	5.6180	2.414	.00000005	0.17344
1800.00	5.5556	2.414	.00000005	0.17344
1820.00	5.4945	2.415	.00000005	0.17348
1840.00	5.4348	2.415	.00000005	0.17353
1860.00	5.3763	2.415	.00000005	0.17353
1880.00	5.3191	2.415	.00000005	0.17353
1900.00	5.2632	2.415	.00000005	0.17358
1920.00	5.2083	2.415	.00000004	0.17358
1940.00	5.1546	2.415	.00000004	0.17358
1960.00	5.1020	2.415	.00000004	0.17358
1980.00	5.0505	2.415	.00000004	0.17358
2000.00	5.0000	2.415	.00000004	0.17358
2020.00	4.9505	2.415	.00000004	0.17358
2040.00	4.9020	2.415	.00000004	0.17353
2060.00	4.8544	2.415	.00000004	0.17353
2080.00	4.8077	2.415	.00000003	0.17348
2100.00	4.7619	2.415	.00000003	0.17348
2120.00	4.7170	2.415	.00000003	0.17348
2140.00	4.6729	2.415	.00000003	0.17348
2160.00	4.6296	2.415	.00000003	0.17353
2180.00	4.5872	2.415	.00000003	0.17353
2200.00	4.5455	2.415	.00000002	0.17358
2220.00	4.5045	2.415	.00000002	0.17358
2240.00	4.4643	2.416	.00000002	0.17363
2260.00	4.4248	2.416	.00000002	0.17368
2280.00	4.3860	2.416	.00000002	0.17368
2300.00	4.3478	2.416	.00000001	0.17373
2320.00	4.3103	2.417	.00000001	0.17378
2340.00	4.2735	2.417	.00000001	0.17378
2360.00	4.2373	2.417	.00000001	0.17378
2380.00	4.2017	2.417	.00000000	0.17383
2400.00	4.1667	2.417	.00000000	0.17383
2420.00	4.1322	2.416	.00000000	0.17383
2440.00	4.0984	2.417	.00000000	0.17378

Table 7. Zinc Selenide (ZnSe).

PAGE 3

WN	WL	N	K	R
2460.00	4.0650	2.416	.0000000	0.17378
2480.00	4.0323	2.414	.0000000	0.17373
2500.00	4.0000	2.416	.0000000	0.17373
2520.00	3.9683	2.415	.0000000	0.17373
2540.00	3.9370	2.414	.0000000	0.17373
2560.00	3.9063	2.414	.0000000	0.17373
2580.00	3.8760	2.414	.0000000	0.17373
2600.00	3.8462	2.414	.0000000	0.17378
2620.00	3.8168	2.414	.0000000	0.17383
2640.00	3.7879	2.413	.0000000	0.17383
2660.00	3.7594	2.413	.0000000	0.17388
2680.00	3.7313	2.414	.0000000	0.17393
2700.00	3.7037	2.414	.0000000	0.17398
2720.00	3.6765	2.414	.0000000	0.17403
2740.00	3.6496	2.413	.0000000	0.17403
2760.00	3.6232	2.413	.0000000	0.17408
2780.00	3.5971	2.413	.0000000	0.17412
2800.00	3.5714	2.413	.0000000	0.17412
2820.00	3.5461	2.413	.0000000	0.17417
2840.00	3.5211	2.414	.0000000	0.17422
2860.00	3.4965	2.414	.0000000	0.17422
2880.00	3.4722	2.414	.0000000	0.17422
2900.00	3.4483	2.414	.0000000	0.17422
2920.00	3.4247	2.415	.0000000	0.17422
2940.00	3.4014	2.416	.0000000	0.17422
2960.00	3.3784	2.414	.0000000	0.17422
2980.00	3.3557	2.414	.0000000	0.17422
3000.00	3.3333	2.413	.0000000	0.17427
3020.00	3.3113	2.413	.0000000	0.17427
3040.00	3.2895	2.414	.0000000	0.17432
3060.00	3.2680	2.413	.0000000	0.17432
3080.00	3.2468	2.414	.0000000	0.17437
3100.00	3.2258	2.414	.0000000	0.17442
3120.00	3.2051	2.414	.0000000	0.17447
3140.00	3.1847	2.415	.0000000	0.17447
3160.00	3.1646	2.415	.0000000	0.17447
3180.00	3.1447	2.415	.0000000	0.17452
3200.00	3.1250	2.416	.0000000	0.17452
3220.00	3.1056	2.416	.0000000	0.17457
3240.00	3.0864	2.416	.0000000	0.17462
3260.00	3.0675	2.416	.0000000	0.17462
3280.00	3.0488	2.416	.0000000	0.17467
3300.00	3.0303	2.416	.0000000	0.17472
3320.00	3.0120	2.416	.0000000	0.17472
3340.00	2.9940	2.417	.0000000	0.17476
3360.00	2.9762	2.416	.0000000	0.17476
3380.00	2.9586	2.417	.0000000	0.17476
3400.00	2.9412	2.417	.0000000	0.17481
3420.00	2.9240	2.417	.0000000	0.17481
3440.00	2.9070	2.418	.0000000	0.17481

Table 7. Zinc Selenide (ZnSe).

PAGE 4

WN	WL	N	K	R
3460.00	2.8902	2.418	.0000000	0.17481
3480.00	2.8736	2.418	.0000000	0.17486
3500.00	2.8571	2.418	.0000000	0.17486
3520.00	2.8409	2.419	.0000000	0.17486
3540.00	2.8249	2.418	.0000000	0.17486
3560.00	2.8090	2.418	.0000000	0.17491
3580.00	2.7933	2.418	.0000000	0.17491
3600.00	2.7778	2.418	.0000000	0.17491
3620.00	2.7624	2.419	.0000000	0.17491
3640.00	2.7473	2.419	.0000000	0.17496
3660.00	2.7322	2.419	.0000000	0.17501
3680.00	2.7174	2.419	.0000000	0.17501
3700.00	2.7027	2.419	.0000000	0.17506
3720.00	2.6882	2.419	.0000000	0.17511
3740.00	2.6738	2.420	.0000000	0.17516
3760.00	2.6596	2.420	.0000000	0.17516
3780.00	2.6455	2.420	.0000000	0.17516
3800.00	2.6316	2.420	.0000000	0.17521
3820.00	2.6178	2.420	.0000000	0.17521
3840.00	2.6042	2.421	.0000000	0.17521
3860.00	2.5907	2.421	.0000000	0.17521
3880.00	2.5773	2.421	.0000000	0.17521
3900.00	2.5641	2.421	.0000000	0.17521
3920.00	2.5510	2.421	.0000000	0.17521
3940.00	2.5381	2.421	.0000000	0.17516
3960.00	2.5253	2.421	.0000000	0.17516
3980.00	2.5126	2.421	.0000000	0.17516
4000.00	2.5000	2.421	.0000000	0.17516
4032.26	2.4800	2.422	.0000000	0.17526
4065.04	2.4600	2.422	.0000000	0.17526
4098.36	2.4400	2.422	.0000000	0.17531
4132.23	2.4200	2.422	.0000000	0.17536
4166.67	2.4000	2.423	.0000000	0.17536
4201.68	2.3800	2.423	.0000000	0.17540
4237.29	2.3600	2.423	.0000000	0.17545
4273.50	2.3400	2.424	.0000000	0.17550
4310.34	2.3200	2.424	.0000000	0.17555
4347.83	2.3000	2.424	.0000000	0.17560
4385.96	2.2800	2.424	.0000000	0.17570
4424.78	2.2600	2.425	.0000000	0.17575
4464.29	2.2400	2.425	.0000000	0.17580
4504.50	2.2200	2.426	.0000000	0.17585
4545.45	2.2000	2.425	.0000000	0.17590
4587.16	2.1800	2.426	.0000000	0.17595
4629.63	2.1600	2.426	.0000000	0.17599
4672.90	2.1400	2.427	.0000000	0.17604
4716.98	2.1200	2.427	.0000000	0.17614
4761.90	2.1000	2.428	.0000000	0.17619
4807.69	2.0800	2.428	.0000000	0.17624
4854.37	2.0600	2.428	.0000000	0.17629

Table 7. Zinc Selenide (ZnSe).

PAGE 5

WN	WL	N	K	R
4901.96	2.0400	2.429	.0000000	0.17634
4950.50	2.0200	2.430	.0000000	0.17644
5000.00	2.0000	2.431	.0000000	0.17649
5050.51	1.9800	2.431	.0000000	0.17654
5102.04	1.9600	2.431	.0000000	0.17659
5154.64	1.9400	2.431	.0000000	0.17663
5208.33	1.9200	2.432	.0000000	0.17668
5263.16	1.9000	2.432	.0000000	0.17668
5319.15	1.8800	2.432	.0000000	0.17673
5376.34	1.8600	2.432	.0000000	0.17678
5434.78	1.8400	2.433	.0000000	0.17683
5494.51	1.8200	2.434	.0000000	0.17688
5555.56	1.8000	2.435	.0000000	0.17693
5617.98	1.7800	2.435	.0000000	0.17698
5681.82	1.7600	2.436	.0000000	0.17698
5747.13	1.7400	2.436	.0000000	0.17703
5813.95	1.7200	2.437	.0000000	0.17708
5882.35	1.7000	2.437	.0000000	0.17713
5952.38	1.6800	2.438	.0000000	0.17718
6024.10	1.6600	2.438	.0000000	0.17723
6097.56	1.6400	2.439	.0000000	0.17727
6172.84	1.6200	2.439	.0000000	0.17732
6250.00	1.6000	2.440	.0000000	0.17737
6329.11	1.5800	2.441	.0000000	0.17742
6410.26	1.5600	2.441	.0000000	0.17747
6493.51	1.5400	2.443	.0000000	0.17752
6578.95	1.5200	2.444	.0000000	0.17762
6666.67	1.5000	2.444	.0000000	0.17767
6756.76	1.4800	2.444	.0000000	0.17772
6849.32	1.4600	2.445	.0000000	0.17782
6944.44	1.4400	2.445	.0000000	0.17787
7042.25	1.4200	2.446	.0000000	0.17796
7142.36	1.4000	2.447	.0000000	0.17801
7246.38	1.3800	2.447	.0000000	0.17811
7352.94	1.3600	2.448	.0000000	0.17821
7462.69	1.3400	2.448	.0000000	0.17826
7575.76	1.3200	2.449	.0000000	0.17836
7692.31	1.3000	2.449	.0000000	0.17841
7812.50	1.2800	2.450	.0000001	0.17855
7936.51	1.2600	2.451	.0000001	0.17860
8064.52	1.2400	2.452	.0000001	0.17875
8196.72	1.2200	2.453	.0000001	0.17890
8333.33	1.2000	2.454	.0000001	0.17905
8474.58	1.1800	2.454	.0000001	0.17910
8620.69	1.1600	2.456	.0000001	0.17929
8771.93	1.1400	2.456	.0000001	0.17939
8928.57	1.1200	2.457	.0000001	0.17954
9090.91	1.1000	2.458	.0000001	0.17964
9259.26	1.0800	2.458	.0000001	0.17969
9433.96	1.0600	2.458	.0000001	0.17969

Table 7. Zinc Selenide (ZnSe).

PAGE 6

WN	WL	N	K	R
9615.38	1.0400	2.459	.00000001	0.17974
9803.92	1.0200	2.459	.00000001	0.17983
10000.00	1.0000	2.460	.00000002	0.17998
10204.08	0.9800	2.461	.00000002	0.18003
10416.67	0.9600	2.462	.00000002	0.18023
10638.30	0.9400	2.464	.00000002	0.18042
10869.57	0.9200	2.464	.00000002	0.18042
11111.11	0.9000	2.464	.00000002	0.18052
11363.64	0.8800	2.466	.00000002	0.18077
11627.91	0.8600	2.468	.00000002	0.18106
11904.76	0.8400	2.470	.00000002	0.18141
12195.12	0.8200	2.476	.00000002	0.18220
12500.00	0.8000	2.482	.00000003	0.18308
12820.51	0.7800	2.489	.00000003	0.18402
13157.89	0.7600	2.497	.00000003	0.18515
13513.51	0.7400	2.504	.00000003	0.18608
13888.89	0.7200	2.510	.00000003	0.18697
14285.71	0.7000	2.516	.00000003	0.18776
14705.88	0.6800	2.521	.00000003	0.18854
15151.52	0.6600	2.528	.00000004	0.18953
15625.00	0.6400	2.537	.00000004	0.19081
16129.03	0.6200	2.548	.00000004	0.19233
16666.67	0.6000	2.560	.00000005	0.19401
17241.38	0.5800	2.578	.00000006	0.19642
17857.14	0.5600	2.596	.00000008	0.19893
18518.52	0.5400	2.620	.00000015	0.20218
19230.77	0.5200	2.650	.00000043	0.20641
20000.00	0.5000	2.693	.00000121	0.21222



4.8 Montmorillonite  $\text{Al}_{1.7}\text{Mg}_{0.33}[(\text{OH})_2/\text{Si}_4\text{O}_{10}]\text{Na}_{0.33}(\text{H}_2\text{O})_4$

Montmorillonite is an optically biaxial monoclinic crystal with specific gravity in the range 2-3. For Na light the refractive indices<sup>12</sup> are  $n_x=1.475-1.503$ ,  $n_y=1.499-1.533$ , and  $n_z=1.500-1.534$ . This material can not be obtained in its crystalline form in sizes large enough for specular reflectance measurements. Thus powder samples of montmorillonite (bentonite) were obtained from Ward's Natural Science Establishment, Rochester, NY. The sample was from Wyoming.

The sample was prepared for reflectance measurements as follows. Colloidal suspensions of montmorillonite in acetone were prepared by use of an ultrasonic technique, were decanted and filtered, and were dried in air and then in an oven at a temperature of about 270 C°. The dried colloidal powder was then compacted between polished stainless steel rams at a pressure of 0.67 GPa to form 13 mm dia. and approximately 1 mm thick pellets. A minimum of 10 pellets possessing seemingly visual specular surfaces were prepared. Near normal incidence (6.5 deg) reflectance spectra of all the pellets were in excellent agreement with regard to magnitude and infrared band structure. However, there was one pellet for which the reflectance spectrum was slightly greater in the spectral regions of the resonant lattice vibrations. The reflectance spectrum, acquired in a manner similar to that described in Secs. 4.1-4.3, of the montmorillonite pellet is presented in Figures 15 and 16.

The reflectance spectrum shown in Figure 16 for the uv-vis-nir region decreases from higher to lower wavelength. Additionally, assuming  $k$  of  $n+ik$  to be zero yields a value on  $n$  of about 1.3 at 590 nm wavelength. This does not compare well with the minimum values of  $n_x$ ,  $n_y$ , and  $n_z$ . The reflectance spectrum in the visible and ultraviolet regions was judged to be that of an optically rough surface. However, a total reflectance spectrum (specular + diffuse) was nearly identical to the specular reflectance spectrum shown in Figure 16.

Complex refractive index  $n+ik$  spectra were obtained in the infrared region by use of Kramers-Kronig methods. For this purpose the infrared reflectance spectrum was extended from 180  $\text{cm}^{-1}$  to 50  $\text{cm}^{-1}$  by use of reflectance measurements made on the same pellet at Simon Fraser University, Burnaby, B.C., Canada by Dr. Bruce P. Clayman. A Brucker Fourier-transform infrared spectrometer was used for the far-infrared measurements. Spectral values of  $n$  and  $k$  for montmorillonite in the infrared are presented graphically in Figure 15, and are tabulated in Table 8.

MONTMORILLONITE PELLET

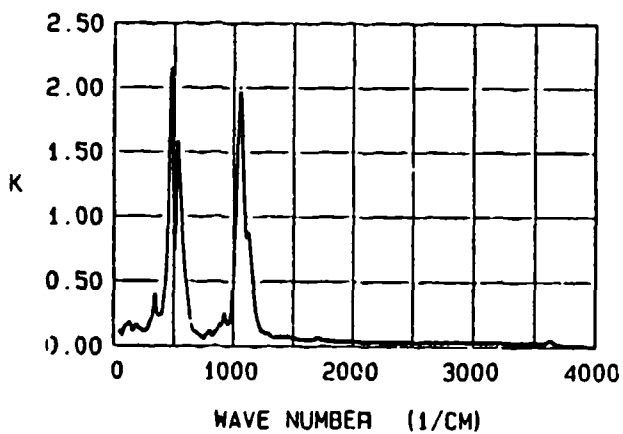
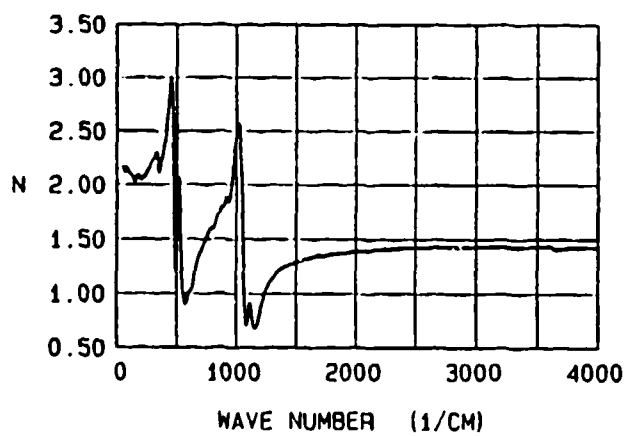
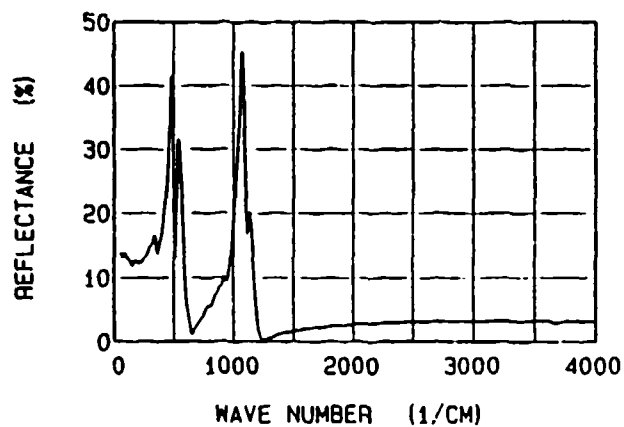


Figure 15. The infrared ( $50\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  for colloidal montmorillonite pellets .

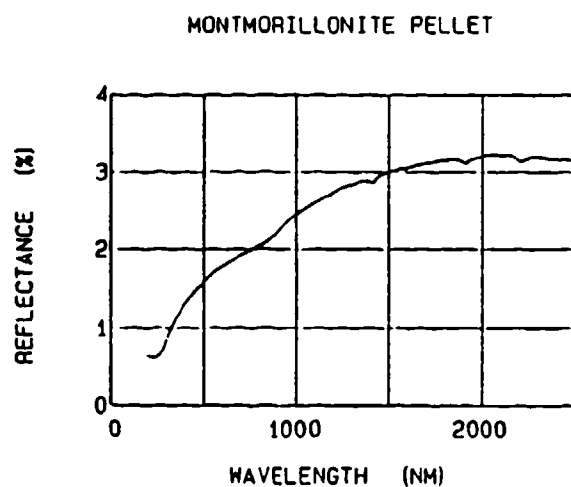


Figure 16. The uv-vis-nir (200-2,500 nm) reflectance spectrum of colloidal montmorillonite pellets.

Table 8. Montmorillonite Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
50.00	200.0000	2.172	0.100	0.022	0.042	0.13895
60.00	166.6667	2.128	0.114	0.012	0.040	0.13280
70.00	142.8571	2.119	0.087	0.011	0.039	0.13090
80.00	125.0000	2.151	0.092	0.011	0.040	0.13585
90.00	111.1111	2.151	0.138	0.013	0.041	0.13670
100.00	100.0000	2.119	0.152	0.014	0.039	0.13245
110.00	90.9091	2.109	0.156	0.014	0.039	0.13100
120.00	83.3333	2.097	0.166	0.014	0.038	0.12960
130.00	76.9231	2.079	0.180	0.015	0.038	0.12730
140.00	71.4286	2.041	0.176	0.014	0.036	0.12160
150.00	66.6667	2.024	0.138	0.013	0.035	0.11795
160.00	62.5000	2.047	0.111	0.012	0.036	0.12075
170.00	58.8235	2.076	0.117	0.012	0.037	0.12510
180.00	55.5556	2.085	0.139	0.013	0.038	0.12700
190.00	52.6316	2.073	0.157	0.014	0.037	0.12580
200.00	50.0000	2.053	0.154	0.014	0.036	0.12275
210.00	47.6190	2.052	0.135	0.013	0.036	0.12205
220.00	45.4545	2.065	0.130	0.013	0.037	0.12380
230.00	43.4783	2.066	0.126	0.012	0.037	0.12395
240.00	41.6667	2.079	0.112	0.012	0.037	0.12550
250.00	40.0000	2.103	0.109	0.012	0.038	0.12905
260.00	38.4615	2.124	0.114	0.012	0.039	0.13220
270.00	37.0370	2.146	0.117	0.012	0.040	0.13550
280.00	35.7143	2.176	0.126	0.013	0.042	0.14005
290.00	34.4828	2.206	0.149	0.014	0.043	0.14505
300.00	33.3333	2.221	0.180	0.016	0.044	0.14810
310.00	32.2581	2.234	0.197	0.016	0.045	0.15045
320.00	31.2500	2.266	0.223	0.018	0.046	0.15595
330.00	30.3030	2.299	0.290	0.021	0.048	0.16335
340.00	29.4118	2.239	0.397	0.026	0.045	0.16075
350.00	28.5714	2.117	0.349	0.022	0.040	0.14085
360.00	27.7778	2.150	0.247	0.018	0.041	0.14020
370.00	27.0270	2.216	0.239	0.018	0.044	0.14935
380.00	26.3158	2.262	0.233	0.018	0.046	0.15575
390.00	25.6410	2.331	0.234	0.019	0.050	0.16565
400.00	25.0000	2.412	0.247	0.020	0.054	0.17750
410.00	24.3902	2.538	0.291	0.023	0.061	0.19630
420.00	23.8095	2.642	0.412	0.031	0.066	0.21540
430.00	23.2558	2.727	0.522	0.038	0.071	0.23200
440.00	22.7273	2.871	0.706	0.051	0.078	0.26045
450.00	22.2222	2.970	1.032	0.073	0.079	0.29620
460.00	21.7391	2.942	1.570	0.105	0.064	0.34870
470.00	21.2766	2.286	2.135	0.107	0.010	0.40690
480.00	20.8333	1.454	1.872	0.061	0.030	0.39225
490.00	20.4082	1.207	1.257	0.034	0.015	0.25415
500.00	20.0000	1.436	0.802	0.026	0.009	0.12840
510.00	19.6078	1.903	0.797	0.036	0.027	0.16185
520.00	19.2308	2.033	1.305	0.060	0.021	0.25630
530.00	18.8679	1.579	1.581	0.056	0.015	0.31240
540.00	18.5185	1.213	1.435	0.040	0.020	0.30525

Table 8. Montmorillonite Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
550.00	18.1818	1.043	1.230	0.030	0.018	0.26900
560.00	17.8571	0.955	1.051	0.023	0.015	0.22740
570.00	17.5439	0.907	0.881	0.019	0.013	0.18045
580.00	17.2414	0.906	0.723	0.016	0.010	0.13025
590.00	16.9492	0.939	0.598	0.014	0.008	0.08935
600.00	16.6667	0.983	0.510	0.012	0.007	0.06335
610.00	16.3934	1.018	0.451	0.011	0.007	0.04855
620.00	16.1290	1.031	0.401	0.010	0.007	0.03865
630.00	15.8730	1.030	0.325	0.008	0.007	0.02580
640.00	15.6250	1.068	0.229	0.007	0.010	0.01345
650.00	15.3846	1.142	0.167	0.011	0.012	0.01060
660.00	15.1515	1.208	0.139	0.012	0.011	0.01300
670.00	14.9254	1.259	0.122	0.012	0.011	0.01635
680.00	14.7059	1.306	0.112	0.012	0.011	0.02035
690.00	14.4928	1.341	0.111	0.012	0.012	0.02390
700.00	14.2857	1.365	0.105	0.011	0.012	0.02625
710.00	14.0845	1.392	0.094	0.011	0.012	0.02885
720.00	13.8889	1.419	0.085	0.011	0.013	0.03180
730.00	13.6986	1.446	0.077	0.010	0.014	0.03485
740.00	13.5135	1.473	0.071	0.010	0.014	0.03805
750.00	13.3333	1.502	0.065	0.010	0.015	0.04160
760.00	13.1579	1.537	0.062	0.010	0.016	0.04615
770.00	12.9870	1.571	0.075	0.010	0.017	0.05100
780.00	12.8205	1.590	0.093	0.010	0.018	0.05390
790.00	12.6582	1.602	0.107	0.011	0.019	0.05605
800.00	12.5000	1.593	0.115	0.011	0.018	0.05510
810.00	12.3457	1.600	0.086	0.010	0.018	0.05510
820.00	12.1951	1.638	0.071	0.010	0.019	0.06015
830.00	12.0482	1.677	0.075	0.010	0.021	0.06575
840.00	11.9048	1.711	0.093	0.010	0.022	0.07090
850.00	11.7647	1.727	0.112	0.011	0.023	0.07370
860.00	11.6279	1.744	0.114	0.011	0.024	0.07625
870.00	11.4943	1.782	0.128	0.012	0.025	0.08210
880.00	11.3636	1.794	0.163	0.013	0.026	0.08510
890.00	11.2360	1.793	0.165	0.013	0.026	0.08495
900.00	11.1111	1.829	0.157	0.013	0.027	0.09000
910.00	10.9890	1.876	0.199	0.015	0.029	0.09845
920.00	10.8696	1.861	0.250	0.016	0.029	0.09870
930.00	10.7527	1.833	0.234	0.016	0.028	0.09400
940.00	10.6383	1.859	0.193	0.014	0.028	0.09565
950.00	10.5263	1.924	0.169	0.014	0.031	0.10420
960.00	10.4167	2.009	0.169	0.014	0.034	0.11665
970.00	10.3093	2.112	0.188	0.015	0.039	0.13250
980.00	10.2041	2.242	0.248	0.019	0.045	0.15350
990.00	10.1010	2.374	0.367	0.026	0.052	0.17750
1000.00	10.0000	2.486	0.546	0.036	0.057	0.20335
1010.00	9.9010	2.559	0.790	0.050	0.059	0.23195
1020.00	9.8039	2.541	1.100	0.066	0.052	0.26300
1030.00	9.7087	2.400	1.398	0.076	0.037	0.29200
1040.00	9.6154	2.177	1.665	0.080	0.016	0.32565

Table 8. Montmorillonite Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
1050.00	9.5238	1.828	1.892	0.077	0.018	0.37090
1060.00	9.4340	1.337	1.948	0.059	0.036	0.42475
1070.00	9.3458	0.892	1.706	0.035	0.036	0.45310
1080.00	9.2593	0.709	1.342	0.022	0.027	0.40225
1090.00	9.1743	0.714	1.058	0.018	0.019	0.29940
1100.00	9.0909	0.793	0.884	0.017	0.014	0.20945
1110.00	9.0090	0.887	0.826	0.017	0.012	0.16655
1120.00	8.9286	0.894	0.864	0.018	0.013	0.17725
1130.00	8.8496	0.794	0.849	0.016	0.014	0.19690
1140.00	8.7719	0.711	0.749	0.013	0.013	0.18810
1150.00	8.6957	0.676	0.629	0.011	0.012	0.15955
1160.00	8.6207	0.679	0.515	0.009	0.010	0.12230
1170.00	8.5470	0.700	0.424	0.008	0.009	0.09020
1180.00	8.4746	0.724	0.337	0.008	0.008	0.06320
1190.00	8.4034	0.773	0.256	0.007	0.008	0.03770
1200.00	8.3333	0.831	0.206	0.008	0.008	0.02150
1210.00	8.2645	0.880	0.171	0.008	0.009	0.01260
1220.00	8.1967	0.926	0.144	0.009	0.011	0.00725
1230.00	8.1301	0.968	0.127	0.007	0.015	0.00450
1240.00	8.0645	1.005	0.117	0.003	0.017	0.00350
1250.00	8.0000	1.033	0.113	0.007	0.018	0.00340
1260.00	7.9365	1.054	0.104	0.010	0.018	0.00335
1270.00	7.8740	1.081	0.097	0.013	0.016	0.00375
1280.00	7.8125	1.101	0.098	0.014	0.014	0.00460
1290.00	7.7519	1.112	0.095	0.014	0.013	0.00495
1300.00	7.6923	1.126	0.089	0.014	0.012	0.00535
1310.00	7.6336	1.139	0.081	0.015	0.011	0.00580
1320.00	7.5758	1.155	0.075	0.015	0.010	0.00650
1330.00	7.5188	1.170	0.069	0.014	0.010	0.00730
1340.00	7.4627	1.187	0.068	0.014	0.009	0.00845
1350.00	7.4074	1.199	0.067	0.014	0.009	0.00930
1360.00	7.3529	1.215	0.070	0.013	0.009	0.01065
1370.00	7.2993	1.220	0.075	0.013	0.009	0.01115
1380.00	7.2464	1.227	0.071	0.013	0.009	0.01160
1390.00	7.1942	1.236	0.072	0.013	0.009	0.01240
1400.00	7.1429	1.242	0.073	0.013	0.009	0.01295
1410.00	7.0922	1.246	0.075	0.012	0.010	0.01335
1420.00	7.0423	1.250	0.071	0.012	0.009	0.01360
1430.00	6.9930	1.257	0.071	0.012	0.009	0.01425
1440.00	6.9444	1.262	0.071	0.012	0.010	0.01465
1450.00	6.8966	1.266	0.072	0.012	0.010	0.01510
1460.00	6.8493	1.266	0.072	0.012	0.010	0.01505
1470.00	6.8027	1.269	0.065	0.012	0.009	0.01515
1480.00	6.7568	1.276	0.063	0.012	0.009	0.01580
1490.00	6.7114	1.280	0.063	0.012	0.009	0.01620
1500.00	6.6667	1.284	0.061	0.012	0.009	0.01650
1510.00	6.6225	1.287	0.061	0.012	0.010	0.01680
1520.00	6.5789	1.291	0.058	0.011	0.009	0.01710
1530.00	6.5359	1.294	0.057	0.011	0.010	0.01740
1540.00	6.4935	1.297	0.053	0.011	0.009	0.01760

Table 8. Montmorillonite Pellet.

PAGE 4

WN	WL	N	K	DN	DK	R
1550.00	6.4516	1.304	0.051	0.011	0.009	0.01820
1560.00	6.4103	1.307	0.051	0.011	0.010	0.01860
1570.00	6.3694	1.313	0.048	0.011	0.010	0.01910
1580.00	6.3291	1.318	0.050	0.011	0.010	0.01970
1590.00	6.2893	1.321	0.050	0.011	0.010	0.02000
1600.00	6.2500	1.325	0.051	0.011	0.010	0.02040
1610.00	6.2112	1.329	0.050	0.011	0.010	0.02085
1620.00	6.1728	1.331	0.054	0.011	0.010	0.02105
1630.00	6.1350	1.330	0.051	0.011	0.010	0.02095
1640.00	6.0976	1.335	0.050	0.011	0.010	0.02140
1650.00	6.0606	1.337	0.049	0.011	0.010	0.02165
1660.00	6.0241	1.341	0.048	0.011	0.010	0.02210
1670.00	5.9880	1.346	0.048	0.011	0.010	0.02265
1680.00	5.9524	1.353	0.053	0.011	0.011	0.02350
1690.00	5.9172	1.352	0.063	0.011	0.011	0.02360
1700.00	5.8824	1.344	0.064	0.011	0.011	0.02270
1710.00	5.8480	1.343	0.061	0.011	0.011	0.02250
1720.00	5.8140	1.340	0.059	0.011	0.010	0.02215
1730.00	5.7803	1.338	0.053	0.011	0.010	0.02185
1740.00	5.7471	1.341	0.048	0.011	0.010	0.02205
1750.00	5.7143	1.345	0.046	0.010	0.010	0.02240
1760.00	5.6818	1.347	0.043	0.010	0.010	0.02260
1770.00	5.6497	1.352	0.041	0.010	0.010	0.02315
1780.00	5.6180	1.355	0.042	0.010	0.010	0.02345
1790.00	5.5866	1.358	0.041	0.010	0.010	0.02375
1800.00	5.5556	1.359	0.043	0.010	0.010	0.02395
1810.00	5.5249	1.361	0.041	0.010	0.010	0.02410
1820.00	5.4945	1.362	0.042	0.010	0.011	0.02430
1830.00	5.4645	1.363	0.040	0.010	0.011	0.02430
1840.00	5.4348	1.367	0.040	0.010	0.011	0.02480
1850.00	5.4054	1.368	0.042	0.010	0.011	0.02490
1860.00	5.3763	1.367	0.041	0.010	0.011	0.02485
1870.00	5.3476	1.370	0.041	0.010	0.011	0.02510
1880.00	5.3191	1.370	0.040	0.010	0.011	0.02515
1890.00	5.2910	1.372	0.040	0.010	0.011	0.02530
1900.00	5.2632	1.372	0.039	0.010	0.011	0.02530
1910.00	5.2356	1.374	0.038	0.010	0.011	0.02555
1920.00	5.2083	1.375	0.038	0.010	0.011	0.02570
1930.00	5.1813	1.376	0.038	0.010	0.011	0.02575
1940.00	5.1546	1.378	0.037	0.010	0.011	0.02595
1950.00	5.1282	1.379	0.038	0.010	0.011	0.02615
1960.00	5.1020	1.379	0.037	0.010	0.011	0.02610
1970.00	5.0761	1.380	0.035	0.010	0.011	0.02620
1980.00	5.0505	1.382	0.035	0.010	0.011	0.02645
1990.00	5.0251	1.384	0.036	0.010	0.011	0.02660
2000.00	5.0000	1.383	0.034	0.010	0.011	0.02650
2010.00	4.9751	1.387	0.032	0.010	0.011	0.02695
2020.00	4.9505	1.388	0.034	0.010	0.011	0.02715
2030.00	4.9261	1.388	0.035	0.010	0.011	0.02715
2040.00	4.9020	1.389	0.034	0.010	0.011	0.02725



Table 8. Montmorillonite Pellet.

PAGE 5

WN	WL	N	K	DN	DK	R
2050.00	4.8780	1.391	0.034	0.010	0.011	0.02740
2060.00	4.8544	1.391	0.033	0.010	0.011	0.02745
2070.00	4.8309	1.393	0.032	0.010	0.011	0.02760
2080.00	4.8077	1.394	0.033	0.010	0.011	0.02780
2090.00	4.7847	1.394	0.032	0.010	0.011	0.02775
2100.00	4.7619	1.397	0.031	0.010	0.011	0.02810
2110.00	4.7393	1.399	0.032	0.010	0.011	0.02830
2120.00	4.7170	1.399	0.033	0.010	0.011	0.02835
2130.00	4.6948	1.398	0.033	0.010	0.011	0.02825
2140.00	4.6729	1.400	0.031	0.010	0.011	0.02840
2150.00	4.6512	1.402	0.032	0.010	0.011	0.02875
2160.00	4.6296	1.404	0.033	0.010	0.011	0.02895
2170.00	4.6083	1.403	0.036	0.010	0.011	0.02890
2180.00	4.5872	1.402	0.034	0.010	0.011	0.02870
2190.00	4.5662	1.404	0.033	0.010	0.011	0.02900
2200.00	4.5455	1.404	0.035	0.010	0.011	0.02895
2210.00	4.5249	1.403	0.033	0.010	0.011	0.02880
2220.00	4.5045	1.404	0.032	0.010	0.011	0.02900
2230.00	4.4843	1.405	0.031	0.009	0.011	0.02905
2240.00	4.4643	1.409	0.031	0.009	0.012	0.02950
2250.00	4.4444	1.408	0.035	0.010	0.012	0.02945
2260.00	4.4248	1.406	0.032	0.009	0.011	0.02920
2270.00	4.4053	1.409	0.031	0.009	0.012	0.02955
2280.00	4.3860	1.410	0.033	0.009	0.012	0.02965
2290.00	4.3668	1.409	0.033	0.009	0.012	0.02955
2300.00	4.3478	1.409	0.031	0.009	0.012	0.02950
2310.00	4.3290	1.412	0.031	0.009	0.012	0.02985
2320.00	4.3103	1.411	0.031	0.009	0.012	0.02975
2330.00	4.2918	1.413	0.030	0.009	0.012	0.03000
2340.00	4.2735	1.415	0.031	0.009	0.012	0.03025
2350.00	4.2553	1.415	0.033	0.009	0.012	0.03030
2360.00	4.2373	1.414	0.032	0.009	0.012	0.03015
2370.00	4.2194	1.416	0.032	0.009	0.012	0.03040
2380.00	4.2017	1.415	0.033	0.009	0.012	0.03030
2390.00	4.1841	1.416	0.033	0.009	0.012	0.03040
2400.00	4.1667	1.414	0.032	0.009	0.012	0.03010
2410.00	4.1494	1.417	0.028	0.009	0.012	0.03040
2420.00	4.1322	1.421	0.031	0.009	0.012	0.03095
2430.00	4.1152	1.419	0.034	0.009	0.012	0.03070
2440.00	4.0984	1.418	0.032	0.009	0.012	0.03060
2450.00	4.0816	1.421	0.031	0.009	0.012	0.03090
2460.00	4.0650	1.422	0.033	0.009	0.012	0.03110
2470.00	4.0486	1.420	0.034	0.009	0.012	0.03085
2480.00	4.0323	1.421	0.033	0.009	0.012	0.03095
2490.00	4.0161	1.421	0.034	0.009	0.012	0.03095
2500.00	4.0000	1.422	0.033	0.009	0.012	0.03105
2510.00	3.9841	1.421	0.033	0.009	0.012	0.03100
2520.00	3.9683	1.422	0.034	0.009	0.012	0.03115
2530.00	3.9526	1.421	0.034	0.009	0.012	0.03095
2540.00	3.9370	1.422	0.032	0.009	0.012	0.03110

Table 8. Montmorillonite Pellet.

PAGE 6

WN	WL	N	K	DN	DK	R
2550.00	3.9216	1.423	0.033	0.009	0.012	0.03120
2560.00	3.9063	1.423	0.032	0.009	0.012	0.03125
2570.00	3.8911	1.425	0.033	0.009	0.012	0.03140
2580.00	3.8760	1.426	0.033	0.009	0.012	0.03155
2590.00	3.8610	1.426	0.035	0.009	0.012	0.03165
2600.00	3.8462	1.425	0.035	0.009	0.012	0.03150
2610.00	3.8314	1.426	0.036	0.009	0.012	0.03165
2620.00	3.8168	1.424	0.037	0.009	0.012	0.03135
2630.00	3.8023	1.422	0.035	0.009	0.012	0.03115
2640.00	3.7879	1.422	0.032	0.009	0.012	0.03110
2650.00	3.7736	1.426	0.031	0.009	0.012	0.03155
2660.00	3.7594	1.428	0.033	0.009	0.012	0.03185
2670.00	3.7453	1.427	0.035	0.009	0.012	0.03175
2680.00	3.7313	1.427	0.034	0.009	0.012	0.03170
2690.00	3.7175	1.429	0.036	0.009	0.012	0.03200
2700.00	3.7037	1.426	0.039	0.009	0.012	0.03170
2710.00	3.6900	1.423	0.035	0.009	0.012	0.03130
2720.00	3.6765	1.424	0.033	0.009	0.012	0.03140
2730.00	3.6630	1.427	0.030	0.009	0.012	0.03170
2740.00	3.6496	1.431	0.035	0.009	0.012	0.03225
2750.00	3.6364	1.428	0.036	0.009	0.012	0.03185
2760.00	3.6232	1.429	0.035	0.009	0.012	0.03195
2770.00	3.6101	1.429	0.036	0.009	0.012	0.03195
2780.00	3.5971	1.428	0.036	0.009	0.012	0.03185
2790.00	3.5842	1.429	0.036	0.009	0.012	0.03200
2800.00	3.5714	1.429	0.038	0.009	0.012	0.03195
2810.00	3.5587	1.427	0.037	0.009	0.012	0.03180
2820.00	3.5461	1.427	0.036	0.009	0.012	0.03170
2830.00	3.5336	1.429	0.036	0.009	0.012	0.03200
2840.00	3.5211	1.428	0.038	0.009	0.012	0.03190
2850.00	3.5088	1.427	0.037	0.009	0.012	0.03170
2860.00	3.4965	1.426	0.038	0.009	0.012	0.03165
2870.00	3.4843	1.426	0.035	0.009	0.012	0.03155
2880.00	3.4722	1.428	0.035	0.009	0.012	0.03190
2890.00	3.4602	1.428	0.038	0.009	0.012	0.03190
2900.00	3.4483	1.425	0.037	0.009	0.012	0.03145
2910.00	3.4364	1.427	0.034	0.009	0.012	0.03170
2920.00	3.4247	1.427	0.037	0.009	0.012	0.03175
2930.00	3.4130	1.426	0.035	0.009	0.012	0.03160
2940.00	3.4014	1.426	0.036	0.009	0.012	0.03165
2950.00	3.3898	1.425	0.034	0.009	0.012	0.03150
2960.00	3.3784	1.427	0.034	0.009	0.012	0.03170
2970.00	3.3670	1.427	0.034	0.009	0.012	0.03170
2980.00	3.3557	1.426	0.035	0.009	0.012	0.03165
2990.00	3.3445	1.426	0.033	0.009	0.012	0.03155
3000.00	3.3333	1.429	0.033	0.009	0.012	0.03190
3010.00	3.3223	1.429	0.035	0.009	0.012	0.03195
3020.00	3.3113	1.427	0.036	0.009	0.012	0.03170
3030.00	3.3003	1.426	0.034	0.009	0.012	0.03155
3040.00	3.2895	1.427	0.034	0.009	0.012	0.03165

Table 8. Montmorillonite Pellet.

PAGE 7

WN	WL	N	K	DN	DK	R
3050.00	3.2787	1.425	0.034	0.009	0.012	0.03150
3060.00	3.2680	1.426	0.032	0.009	0.012	0.03160
3070.00	3.2573	1.426	0.032	0.009	0.012	0.03160
3080.00	3.2468	1.428	0.032	0.009	0.012	0.03180
3090.00	3.2362	1.427	0.033	0.009	0.012	0.03165
3100.00	3.2258	1.427	0.031	0.009	0.012	0.03165
3110.00	3.2154	1.428	0.031	0.009	0.012	0.03175
3120.00	3.2051	1.428	0.031	0.009	0.012	0.03180
3130.00	3.1949	1.427	0.031	0.009	0.012	0.03170
3140.00	3.1847	1.429	0.030	0.009	0.012	0.03195
3150.00	3.1746	1.429	0.032	0.009	0.012	0.03190
3160.00	3.1646	1.429	0.030	0.009	0.012	0.03190
3170.00	3.1546	1.431	0.033	0.009	0.012	0.03220
3180.00	3.1447	1.429	0.034	0.009	0.012	0.03190
3190.00	3.1348	1.427	0.034	0.009	0.012	0.03175
3200.00	3.1250	1.425	0.031	0.009	0.012	0.03145
3210.00	3.1153	1.429	0.030	0.009	0.012	0.03190
3220.00	3.1056	1.429	0.031	0.009	0.012	0.03190
3230.00	3.0960	1.431	0.032	0.009	0.012	0.03215
3240.00	3.0864	1.427	0.036	0.009	0.012	0.03175
3250.00	3.0769	1.424	0.032	0.009	0.012	0.03130
3260.00	3.0675	1.426	0.029	0.009	0.012	0.03155
3270.00	3.0581	1.428	0.029	0.009	0.012	0.03175
3280.00	3.0488	1.428	0.031	0.009	0.012	0.03185
3290.00	3.0395	1.427	0.031	0.009	0.012	0.03165
3300.00	3.0303	1.426	0.030	0.009	0.012	0.03155
3310.00	3.0211	1.426	0.028	0.009	0.012	0.03155
3320.00	3.0120	1.429	0.028	0.009	0.012	0.03190
3330.00	3.0030	1.429	0.029	0.009	0.012	0.03185
3340.00	2.9940	1.428	0.029	0.009	0.012	0.03180
3350.00	2.9851	1.429	0.030	0.009	0.012	0.03185
3360.00	2.9762	1.427	0.030	0.009	0.012	0.03165
3370.00	2.9674	1.428	0.028	0.009	0.012	0.03180
3380.00	2.9586	1.428	0.030	0.009	0.012	0.03180
3390.00	2.9499	1.425	0.029	0.009	0.012	0.03140
3400.00	2.9412	1.428	0.026	0.009	0.012	0.03170
3410.00	2.9326	1.427	0.030	0.009	0.012	0.03170
3420.00	2.9240	1.425	0.027	0.009	0.012	0.03135
3430.00	2.9155	1.426	0.026	0.009	0.012	0.03155
3440.00	2.9070	1.426	0.025	0.009	0.012	0.03145
3450.00	2.8986	1.427	0.024	0.009	0.012	0.03165
3460.00	2.8902	1.428	0.024	0.009	0.012	0.03175
3470.00	2.8818	1.430	0.025	0.009	0.012	0.03200
3480.00	2.8736	1.428	0.027	0.009	0.012	0.03180
3490.00	2.8653	1.427	0.025	0.009	0.012	0.03160
3500.00	2.8571	1.429	0.023	0.009	0.012	0.03180
3510.00	2.8490	1.429	0.023	0.009	0.012	0.03190
3520.00	2.8409	1.432	0.024	0.009	0.012	0.03225
3530.00	2.8329	1.430	0.026	0.009	0.012	0.03205
3540.00	2.8249	1.431	0.023	0.009	0.012	0.03210

Table 8. Montmorillonite Pellet.

PAGE 8

WN	WL	N	K	DN	DK	R
3550.00	2.8169	1.434	0.025	0.009	0.012	0.03245
3560.00	2.8090	1.432	0.027	0.009	0.012	0.03220
3570.00	2.8011	1.431	0.024	0.009	0.012	0.03215
3580.00	2.7933	1.438	0.023	0.009	0.012	0.03290
3590.00	2.7855	1.442	0.031	0.009	0.012	0.03345
3600.00	2.7778	1.438	0.035	0.009	0.012	0.03305
3610.00	2.7701	1.438	0.039	0.009	0.013	0.03315
3620.00	2.7624	1.433	0.047	0.010	0.013	0.03265
3630.00	2.7548	1.425	0.051	0.010	0.012	0.03170
3640.00	2.7473	1.412	0.050	0.010	0.012	0.03015
3650.00	2.7397	1.404	0.040	0.010	0.012	0.02905
3660.00	2.7322	1.402	0.032	0.010	0.011	0.02875
3670.00	2.7248	1.403	0.026	0.009	0.011	0.02880
3680.00	2.7174	1.404	0.022	0.009	0.011	0.02885
3690.00	2.7100	1.406	0.017	0.009	0.011	0.02910
3700.00	2.7027	1.408	0.016	0.009	0.011	0.02925
3710.00	2.6954	1.408	0.011	0.009	0.011	0.02925
3720.00	2.6882	1.413	0.008	0.009	0.008	0.02985
3730.00	2.6810	1.415	0.009	0.009	0.009	0.03010
3740.00	2.6738	1.418	0.006	0.009	0.006	0.03040
3750.00	2.6667	1.422	0.009	0.009	0.009	0.03090
3760.00	2.6596	1.419	0.009	0.009	0.009	0.03060
3770.00	2.6525	1.422	0.006	0.009	0.006	0.03095
3780.00	2.6455	1.425	0.009	0.009	0.009	0.03125
3790.00	2.6385	1.423	0.009	0.009	0.009	0.03110
3800.00	2.6316	1.425	0.009	0.009	0.009	0.03125
3810.00	2.6247	1.424	0.010	0.009	0.010	0.03115
3820.00	2.6178	1.424	0.009	0.009	0.009	0.03115
3830.00	2.6110	1.424	0.009	0.009	0.009	0.03115
3840.00	2.6042	1.424	0.007	0.009	0.007	0.03120
3850.00	2.5974	1.425	0.008	0.009	0.008	0.03125
3860.00	2.5907	1.425	0.007	0.009	0.007	0.03130
3870.00	2.5840	1.426	0.008	0.009	0.008	0.03145
3880.00	2.5773	1.424	0.008	0.009	0.008	0.03115
3890.00	2.5707	1.425	0.006	0.009	0.006	0.03125
3900.00	2.5641	1.426	0.006	0.009	0.006	0.03140
3910.00	2.5575	1.425	0.006	0.009	0.006	0.03125
3920.00	2.5510	1.426	0.004	0.009	0.004	0.03135
3930.00	2.5445	1.426	0.004	0.008	0.004	0.03140
3940.00	2.5381	1.426	0.004	0.008	0.004	0.03145
3950.00	2.5316	1.427	0.003	0.008	0.003	0.03155
3960.00	2.5253	1.427	0.004	0.008	0.004	0.03155
3970.00	2.5189	1.426	0.004	0.008	0.004	0.03135
3980.00	2.5126	1.425	0.001	0.008	0.001	0.03125
3990.00	2.5063	1.426	0.000	0.008	0.000	0.03145
4000.00	2.5000	1.426	0.000	0.008	0.000	0.03140

#### 4.9 Kaolin $\text{Al}_4[(\text{OH})_9/\text{Si}_4\text{O}_{10}]$

Kaolin is an optically biaxial triclinic crystal with specific gravity in the range 2.61-2.68. For Na light the refractive indices<sup>12</sup> are  $n_x=1.553-1.563$ ,  $n_y=1.559-1.569$ , and  $n_z=1.560-1.570$ . Powdered samples of kaolin were obtained from Ward's Natural Science Establishment, Rochester, NY. The samples were from Georgia.

Samples were prepared and reflectance measurements made using a procedure identical to that described in Sec. 4.8 for montmorillonite. The reflectance spectrum for a kaolin pellet is presented in Figures 17 and 18. The reflectance spectrum in the ultraviolet and visible regions possesses the characteristics of that from an optically rough surface as previously discussed in Sec. 4.8.

Complex refractive index  $n+ik$  spectra were obtained in the infrared region by use of Kramers-Kronig methods applied to the reflectance spectrum. For this purpose the infrared reflectance spectrum was extended from  $180\text{ cm}^{-1}$  to  $50\text{ cm}^{-1}$  by use of spectra acquired on the same pellet by Dr. Bruce P. Clayman (see Sec. 4.8). Spectral values of  $n$  and  $k$  in the infrared for kaolin are presented in Figure 17, and are listed in Table 9.

KAOLIN PELLET

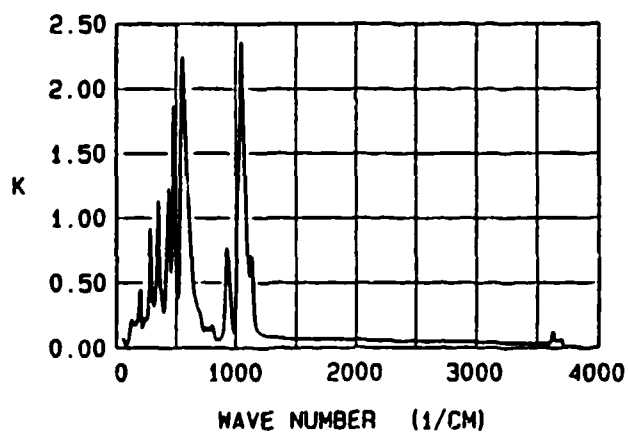
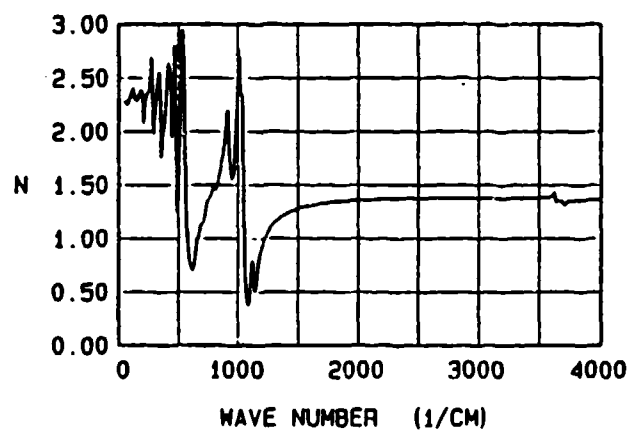
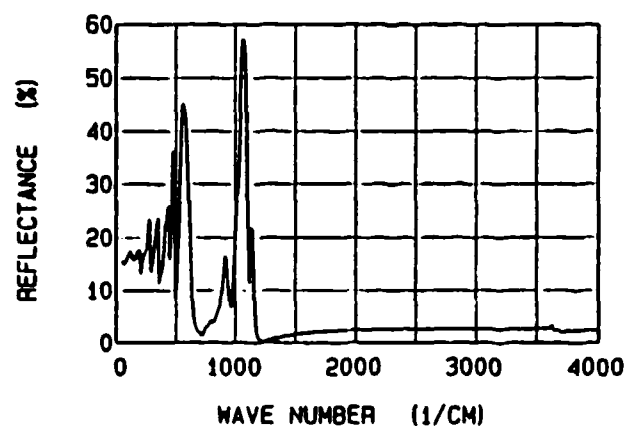


Figure 17. The infrared ( $50\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra for colloidal kaolin pellets.

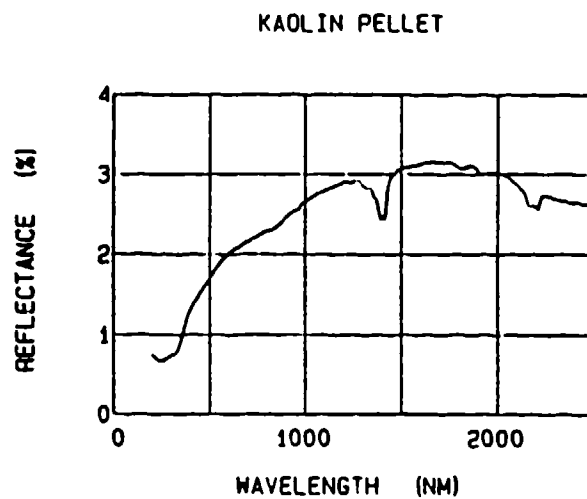


Figure 18. The uv-vis-nir (200-2,500 nm) reflectance spectrum for colloidal kaolin pellets.

Table 9. Kaolin Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
50.00	200.0000	2.297	0.067	0.020	0.028	0.15540
60.00	166.6667	2.253	0.073	0.009	0.027	0.15050
70.00	142.8571	2.253	0.035	0.008	0.026	0.15010
80.00	125.0000	2.286	0.026	0.008	0.026	0.15490
90.00	111.1111	2.320	0.033	0.008	0.028	0.15995
100.00	100.0000	2.362	0.059	0.009	0.030	0.16615
110.00	90.9091	2.396	0.111	0.010	0.031	0.17170
120.00	83.3333	2.372	0.206	0.013	0.031	0.17055
130.00	76.9231	2.304	0.212	0.013	0.029	0.16105
140.00	71.4286	2.286	0.197	0.013	0.028	0.15795
150.00	66.6667	2.286	0.173	0.012	0.028	0.15725
160.00	62.5000	2.315	0.168	0.012	0.029	0.16135
170.00	58.8235	2.368	0.196	0.013	0.031	0.16960
180.00	55.5556	2.382	0.279	0.015	0.031	0.17440
190.00	52.6316	2.339	0.424	0.019	0.030	0.17600
200.00	50.0000	2.077	0.286	0.014	0.023	0.13155
210.00	47.6190	2.212	0.148	0.011	0.026	0.14595
220.00	45.4545	2.301	0.171	0.012	0.029	0.15940
230.00	43.4783	2.343	0.206	0.013	0.030	0.16635
240.00	41.6667	2.368	0.230	0.014	0.031	0.17070
250.00	40.0000	2.423	0.214	0.014	0.033	0.17790
260.00	38.4615	2.609	0.294	0.017	0.039	0.20600
270.00	37.0370	2.641	0.689	0.029	0.039	0.23280
280.00	35.7143	2.052	0.799	0.025	0.021	0.17715
290.00	34.4828	2.054	0.390	0.016	0.023	0.13485
300.00	33.3333	2.210	0.325	0.016	0.027	0.15250
310.00	32.2581	2.324	0.316	0.016	0.030	0.16795
320.00	31.2500	2.462	0.437	0.020	0.034	0.19320
330.00	30.3030	2.549	0.619	0.026	0.037	0.21640
340.00	29.4118	2.405	0.903	0.032	0.030	0.22690
350.00	28.5714	1.754	0.908	0.022	0.013	0.16760
360.00	27.7778	1.922	0.447	0.016	0.020	0.12175
370.00	27.0270	2.006	0.403	0.016	0.022	0.12925
380.00	26.3158	2.109	0.313	0.015	0.024	0.13760
390.00	25.6410	2.278	0.269	0.014	0.028	0.15940
400.00	25.0000	2.527	0.344	0.018	0.036	0.19710
410.00	24.3902	2.598	0.654	0.028	0.038	0.22510
420.00	23.8095	2.583	0.883	0.034	0.036	0.24350
430.00	23.2558	2.279	1.227	0.039	0.023	0.25855
440.00	22.7273	1.928	0.777	0.023	0.018	0.16150
450.00	22.2222	2.321	0.566	0.023	0.030	0.18390
460.00	21.7391	2.797	0.957	0.040	0.043	0.27260
470.00	21.2766	2.158	1.866	0.052	0.007	0.36095
480.00	20.8333	1.316	1.379	0.024	0.011	0.27800
490.00	20.4082	1.370	0.613	0.012	0.008	0.08690
500.00	20.0000	1.837	0.396	0.015	0.018	0.10595
510.00	19.6078	2.222	0.377	0.017	0.027	0.15720
520.00	19.2308	2.729	0.661	0.030	0.042	0.24105
530.00	18.8679	2.947	1.440	0.059	0.043	0.33455
540.00	18.5185	2.363	2.159	0.066	0.007	0.41065



Table 9. Kaolin Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
550.00	18.1818	1.622	2.190	0.048	0.024	0.44655
560.00	17.8571	1.176	1.936	0.031	0.024	0.44820
570.00	17.5439	0.936	1.659	0.022	0.020	0.42675
580.00	17.2414	0.807	1.404	0.016	0.016	0.38655
590.00	16.9492	0.753	1.189	0.013	0.013	0.33180
600.00	16.6667	0.718	1.014	0.011	0.011	0.28140
610.00	16.3934	0.698	0.834	0.009	0.009	0.22290
620.00	16.1290	0.724	0.653	0.008	0.007	0.15070
630.00	15.8730	0.803	0.501	0.007	0.006	0.08465
640.00	15.6250	0.909	0.417	0.007	0.006	0.04880
650.00	15.3846	0.979	0.382	0.006	0.006	0.03685
660.00	15.1515	1.023	0.343	0.005	0.007	0.02870
670.00	14.9254	1.072	0.307	0.005	0.008	0.02320
680.00	14.7059	1.111	0.289	0.006	0.009	0.02155
690.00	14.4928	1.128	0.266	0.006	0.009	0.01940
700.00	14.2857	1.145	0.222	0.008	0.010	0.01545
710.00	14.0845	1.184	0.168	0.010	0.010	0.01325
720.00	13.8889	1.248	0.130	0.011	0.009	0.01580
730.00	13.6986	1.319	0.127	0.010	0.008	0.02225
740.00	13.5135	1.359	0.148	0.010	0.009	0.02750
750.00	13.3333	1.373	0.155	0.010	0.009	0.02945
760.00	13.1579	1.389	0.142	0.010	0.009	0.03050
770.00	12.9870	1.428	0.127	0.010	0.009	0.03435
780.00	12.8205	1.471	0.144	0.010	0.010	0.04025
790.00	12.6582	1.472	0.172	0.010	0.010	0.04180
800.00	12.5000	1.454	0.159	0.010	0.010	0.03890
810.00	12.3457	1.461	0.113	0.010	0.009	0.03785
820.00	12.1951	1.508	0.074	0.009	0.009	0.04260
830.00	12.0482	1.565	0.062	0.009	0.010	0.04995
840.00	11.9048	1.616	0.061	0.008	0.011	0.05685
850.00	11.7647	1.667	0.062	0.008	0.012	0.06400
860.00	11.6279	1.723	0.065	0.008	0.013	0.07210
870.00	11.4943	1.789	0.073	0.009	0.015	0.08180
880.00	11.3636	1.869	0.090	0.009	0.017	0.09395
890.00	11.2360	1.994	0.119	0.010	0.020	0.11300
900.00	11.1111	2.174	0.297	0.015	0.026	0.14605
910.00	10.9890	2.116	0.633	0.022	0.024	0.16475
920.00	10.8696	1.842	0.762	0.021	0.016	0.15065
930.00	10.7527	1.623	0.676	0.017	0.012	0.11665
940.00	10.6383	1.550	0.515	0.014	0.012	0.08515
950.00	10.5263	1.566	0.377	0.012	0.013	0.06985
960.00	10.4167	1.649	0.236	0.011	0.014	0.06850
970.00	10.3093	1.833	0.144	0.010	0.017	0.09010
980.00	10.2041	2.073	0.117	0.010	0.022	0.12475
990.00	10.1010	2.490	0.216	0.014	0.035	0.18725
1000.00	10.0000	2.760	0.845	0.036	0.043	0.25880
1010.00	9.9010	2.446	1.254	0.043	0.028	0.27475
1020.00	9.8039	2.340	1.396	0.044	0.022	0.28800
1030.00	9.7087	2.302	1.845	0.055	0.012	0.35885
1040.00	9.6154	1.602	2.354	0.051	0.030	0.48200

Table 9. Kaolin Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
1050.00	9.5238	0.869	2.074	0.025	0.031	0.55645
1060.00	9.4340	0.572	1.682	0.014	0.022	0.57105
1070.00	9.3458	0.429	1.355	0.009	0.018	0.56055
1080.00	9.2593	0.371	1.052	0.006	0.013	0.50745
1090.00	9.1743	0.413	0.771	0.005	0.010	0.36730
1100.00	9.0909	0.567	0.575	0.005	0.007	0.18995
1110.00	9.0090	0.757	0.566	0.007	0.007	0.11365
1120.00	8.9286	0.729	0.702	0.008	0.008	0.16565
1130.00	8.8496	0.546	0.620	0.006	0.008	0.21690
1140.00	8.7719	0.512	0.408	0.004	0.006	0.17035
1150.00	8.6957	0.597	0.242	0.004	0.005	0.08800
1160.00	8.6207	0.718	0.162	0.005	0.005	0.03675
1170.00	8.5470	0.806	0.144	0.007	0.006	0.01835
1180.00	8.4746	0.863	0.131	0.008	0.007	0.01065
1190.00	8.4034	0.910	0.120	0.009	0.010	0.00635
1200.00	8.3333	0.950	0.113	0.008	0.014	0.00415
1210.00	8.2645	0.982	0.110	0.005	0.017	0.00325
1220.00	8.1967	1.008	0.106	0.002	0.019	0.00285
1230.00	8.1301	1.033	0.098	0.007	0.020	0.00265
1240.00	8.0645	1.057	0.097	0.010	0.018	0.00305
1250.00	8.0000	1.076	0.096	0.012	0.016	0.00355
1260.00	7.9365	1.092	0.093	0.013	0.014	0.00400
1270.00	7.8740	1.107	0.091	0.013	0.013	0.00455
1280.00	7.8125	1.123	0.088	0.014	0.011	0.00520
1290.00	7.7519	1.137	0.088	0.013	0.010	0.00590
1300.00	7.6923	1.148	0.088	0.013	0.010	0.00655
1310.00	7.6336	1.159	0.088	0.013	0.009	0.00720
1320.00	7.5758	1.166	0.086	0.013	0.009	0.00760
1330.00	7.5188	1.174	0.083	0.013	0.009	0.00800
1340.00	7.4627	1.184	0.079	0.013	0.008	0.00855
1350.00	7.4074	1.195	0.078	0.013	0.008	0.00935
1360.00	7.3529	1.203	0.078	0.012	0.008	0.00995
1370.00	7.2993	1.211	0.078	0.012	0.008	0.01055
1380.00	7.2464	1.218	0.077	0.012	0.007	0.01105
1390.00	7.1942	1.224	0.077	0.012	0.007	0.01155
1400.00	7.1429	1.230	0.076	0.012	0.007	0.01205
1410.00	7.0922	1.235	0.076	0.012	0.007	0.01250
1420.00	7.0423	1.242	0.075	0.012	0.007	0.01300
1430.00	6.9930	1.246	0.075	0.012	0.007	0.01340
1440.00	6.9444	1.252	0.075	0.011	0.007	0.01385
1450.00	6.8966	1.256	0.075	0.011	0.007	0.01425
1460.00	6.8493	1.260	0.074	0.011	0.007	0.01460
1470.00	6.8027	1.264	0.073	0.011	0.007	0.01495
1480.00	6.7568	1.269	0.073	0.011	0.007	0.01535
1490.00	6.7114	1.273	0.072	0.011	0.007	0.01570
1500.00	6.6667	1.276	0.072	0.011	0.007	0.01605
1510.00	6.6225	1.281	0.072	0.011	0.007	0.01645
1520.00	6.5789	1.284	0.072	0.011	0.007	0.01675
1530.00	6.5359	1.287	0.072	0.011	0.007	0.01710
1540.00	6.4935	1.291	0.072	0.011	0.007	0.01740

Table 9. Kaolin Pellet.

PAGE 4

WN	WL	N	K	DN	DK	R
1550.00	6.4516	1.293	0.072	0.011	0.007	0.01765
1560.00	6.4103	1.296	0.072	0.011	0.007	0.01795
1570.00	6.3694	1.299	0.071	0.011	0.007	0.01820
1580.00	6.3291	1.301	0.071	0.011	0.007	0.01845
1590.00	6.2893	1.303	0.071	0.011	0.007	0.01865
1600.00	6.2500	1.306	0.071	0.011	0.007	0.01890
1610.00	6.2112	1.309	0.070	0.011	0.007	0.01915
1620.00	6.1728	1.311	0.070	0.011	0.007	0.01935
1630.00	6.1350	1.312	0.070	0.011	0.007	0.01955
1640.00	6.0976	1.315	0.070	0.010	0.007	0.01975
1650.00	6.0606	1.317	0.070	0.010	0.007	0.01995
1660.00	6.0241	1.318	0.070	0.010	0.007	0.02010
1670.00	5.9880	1.320	0.070	0.010	0.007	0.02030
1680.00	5.9524	1.322	0.069	0.010	0.007	0.02045
1690.00	5.9172	1.323	0.068	0.010	0.007	0.02060
1700.00	5.8824	1.325	0.068	0.010	0.007	0.02080
1710.00	5.8480	1.327	0.068	0.010	0.007	0.02100
1720.00	5.8140	1.329	0.068	0.010	0.007	0.02120
1730.00	5.7803	1.331	0.068	0.010	0.007	0.02135
1740.00	5.7471	1.332	0.068	0.010	0.007	0.02155
1750.00	5.7143	1.334	0.068	0.010	0.007	0.02170
1760.00	5.6818	1.335	0.068	0.010	0.007	0.02185
1770.00	5.6497	1.336	0.068	0.010	0.007	0.02195
1780.00	5.6180	1.338	0.068	0.010	0.007	0.02210
1790.00	5.5866	1.339	0.068	0.010	0.007	0.02225
1800.00	5.5556	1.340	0.067	0.010	0.007	0.02235
1810.00	5.5249	1.341	0.068	0.010	0.007	0.02250
1820.00	5.4945	1.342	0.067	0.010	0.007	0.02260
1830.00	5.4645	1.344	0.067	0.010	0.007	0.02275
1840.00	5.4348	1.345	0.068	0.010	0.007	0.02285
1850.00	5.4054	1.346	0.068	0.010	0.007	0.02295
1860.00	5.3763	1.346	0.068	0.010	0.007	0.02305
1870.00	5.3476	1.347	0.068	0.010	0.007	0.02315
1880.00	5.3191	1.348	0.068	0.010	0.007	0.02320
1890.00	5.2910	1.349	0.068	0.010	0.007	0.02330
1900.00	5.2632	1.349	0.068	0.010	0.007	0.02335
1910.00	5.2356	1.350	0.067	0.010	0.007	0.02340
1920.00	5.2083	1.351	0.068	0.010	0.007	0.02350
1930.00	5.1813	1.351	0.067	0.010	0.007	0.02355
1940.00	5.1546	1.352	0.067	0.010	0.007	0.02360
1950.00	5.1282	1.352	0.067	0.010	0.007	0.02365
1960.00	5.1020	1.353	0.067	0.010	0.007	0.02370
1970.00	5.0761	1.354	0.067	0.010	0.007	0.02380
1980.00	5.0505	1.354	0.066	0.010	0.007	0.02380
1990.00	5.0251	1.354	0.066	0.010	0.007	0.02385
2000.00	5.0000	1.355	0.066	0.010	0.007	0.02390
2010.00	4.9751	1.355	0.066	0.010	0.007	0.02390
2020.00	4.9505	1.355	0.066	0.010	0.007	0.02395
2030.00	4.9261	1.355	0.065	0.010	0.007	0.02395
2040.00	4.9020	1.356	0.065	0.010	0.007	0.02400

Table 9. Kaolin Pellet.

PAGE 5

WN	WL	N	K	DN	DK	R
2050.00	4.8780	1.356	0.064	0.010	0.007	0.02400
2060.00	4.8544	1.356	0.064	0.010	0.007	0.02405
2070.00	4.8309	1.357	0.063	0.010	0.007	0.02405
2080.00	4.8077	1.358	0.062	0.010	0.007	0.02415
2090.00	4.7847	1.358	0.062	0.010	0.007	0.02415
2100.00	4.7619	1.358	0.062	0.010	0.007	0.02420
2110.00	4.7393	1.359	0.061	0.010	0.007	0.02425
2120.00	4.7170	1.359	0.060	0.010	0.007	0.02430
2130.00	4.6948	1.360	0.060	0.010	0.007	0.02440
2140.00	4.6729	1.361	0.060	0.010	0.007	0.02445
2150.00	4.6512	1.361	0.059	0.010	0.007	0.02450
2160.00	4.6296	1.362	0.059	0.010	0.007	0.02455
2170.00	4.6083	1.363	0.058	0.010	0.007	0.02460
2180.00	4.5872	1.363	0.058	0.010	0.007	0.02465
2190.00	4.5662	1.364	0.058	0.010	0.007	0.02475
2200.00	4.5455	1.365	0.057	0.010	0.007	0.02480
2210.00	4.5249	1.365	0.057	0.010	0.007	0.02485
2220.00	4.5045	1.366	0.057	0.010	0.007	0.02495
2230.00	4.4843	1.366	0.057	0.010	0.007	0.02500
2240.00	4.4643	1.367	0.057	0.010	0.007	0.02505
2250.00	4.4444	1.367	0.056	0.010	0.007	0.02510
2260.00	4.4248	1.368	0.056	0.010	0.007	0.02515
2270.00	4.4053	1.368	0.056	0.010	0.007	0.02520
2280.00	4.3860	1.369	0.056	0.010	0.007	0.02525
2290.00	4.3668	1.369	0.056	0.010	0.007	0.02530
2300.00	4.3478	1.370	0.056	0.010	0.007	0.02535
2310.00	4.3290	1.370	0.055	0.010	0.007	0.02540
2320.00	4.3103	1.371	0.055	0.010	0.007	0.02545
2330.00	4.2918	1.371	0.055	0.010	0.007	0.02550
2340.00	4.2735	1.372	0.055	0.010	0.007	0.02555
2350.00	4.2553	1.372	0.055	0.010	0.007	0.02560
2360.00	4.2373	1.372	0.055	0.010	0.007	0.02565
2370.00	4.2194	1.373	0.055	0.010	0.007	0.02570
2380.00	4.2017	1.373	0.055	0.010	0.007	0.02575
2390.00	4.1841	1.373	0.054	0.010	0.007	0.02575
2400.00	4.1667	1.374	0.054	0.010	0.007	0.02580
2410.00	4.1494	1.374	0.054	0.010	0.007	0.02585
2420.00	4.1322	1.375	0.055	0.010	0.007	0.02590
2430.00	4.1152	1.375	0.054	0.010	0.007	0.02595
2440.00	4.0984	1.376	0.055	0.010	0.007	0.02600
2450.00	4.0816	1.376	0.054	0.010	0.007	0.02600
2460.00	4.0650	1.376	0.054	0.010	0.007	0.02605
2470.00	4.0486	1.377	0.055	0.010	0.007	0.02610
2480.00	4.0323	1.377	0.055	0.010	0.007	0.02615
2490.00	4.0161	1.377	0.055	0.010	0.007	0.02615
2500.00	4.0000	1.377	0.055	0.010	0.007	0.02615
2510.00	3.9841	1.377	0.055	0.010	0.007	0.02620
2520.00	3.9683	1.377	0.055	0.010	0.007	0.02620
2530.00	3.9526	1.378	0.055	0.010	0.007	0.02625
2540.00	3.9370	1.378	0.055	0.010	0.007	0.02625

Table 9. Kaolin Pellet.

PAGE 6

WN	WL	N	K	DN	DK	R
2550.00	3.9216	1.378	0.055	0.010	0.007	0.02625
2560.00	3.9063	1.378	0.055	0.010	0.007	0.02625
2570.00	3.8911	1.378	0.055	0.010	0.007	0.02625
2580.00	3.8760	1.378	0.055	0.010	0.007	0.02630
2590.00	3.8610	1.378	0.055	0.010	0.007	0.02630
2600.00	3.8462	1.378	0.054	0.010	0.007	0.02630
2610.00	3.8314	1.379	0.055	0.010	0.007	0.02635
2620.00	3.8168	1.379	0.055	0.010	0.007	0.02635
2630.00	3.8023	1.378	0.055	0.010	0.007	0.02630
2640.00	3.7879	1.376	0.055	0.010	0.007	0.02630
2650.00	3.7736	1.378	0.055	0.010	0.007	0.02630
2660.00	3.7594	1.378	0.055	0.010	0.007	0.02625
2670.00	3.7453	1.378	0.055	0.010	0.007	0.02625
2680.00	3.7313	1.378	0.055	0.010	0.007	0.02625
2690.00	3.7175	1.377	0.054	0.010	0.007	0.02620
2700.00	3.7037	1.378	0.054	0.010	0.007	0.02620
2710.00	3.6900	1.378	0.054	0.010	0.007	0.02620
2720.00	3.6765	1.378	0.054	0.010	0.007	0.02620
2730.00	3.6630	1.378	0.053	0.010	0.007	0.02620
2740.00	3.6496	1.378	0.053	0.010	0.007	0.02620
2750.00	3.6364	1.378	0.053	0.010	0.007	0.02620
2760.00	3.6232	1.378	0.053	0.010	0.007	0.02620
2770.00	3.6101	1.378	0.053	0.010	0.007	0.02620
2780.00	3.5971	1.378	0.053	0.010	0.007	0.02620
2790.00	3.5842	1.378	0.053	0.010	0.007	0.02620
2800.00	3.5714	1.378	0.053	0.010	0.007	0.02620
2810.00	3.5587	1.378	0.053	0.010	0.007	0.02620
2820.00	3.5461	1.377	0.053	0.010	0.007	0.02615
2830.00	3.5336	1.377	0.052	0.010	0.007	0.02615
2840.00	3.5211	1.377	0.052	0.010	0.007	0.02615
2850.00	3.5088	1.377	0.052	0.010	0.007	0.02615
2860.00	3.4965	1.377	0.052	0.010	0.007	0.02610
2870.00	3.4843	1.377	0.052	0.010	0.007	0.02605
2880.00	3.4722	1.377	0.051	0.010	0.007	0.02605
2890.00	3.4602	1.377	0.051	0.010	0.007	0.02605
2900.00	3.4483	1.376	0.051	0.010	0.007	0.02600
2910.00	3.4364	1.376	0.051	0.010	0.007	0.02600
2920.00	3.4247	1.376	0.050	0.010	0.007	0.02600
2930.00	3.4130	1.376	0.050	0.010	0.007	0.02600
2940.00	3.4014	1.376	0.050	0.010	0.007	0.02595
2950.00	3.3898	1.376	0.050	0.010	0.007	0.02595
2960.00	3.3784	1.376	0.049	0.010	0.007	0.02595
2970.00	3.3670	1.376	0.049	0.010	0.007	0.02595
2980.00	3.3557	1.376	0.049	0.010	0.007	0.02595
2990.00	3.3445	1.376	0.049	0.010	0.007	0.02590
3000.00	3.3333	1.376	0.049	0.010	0.007	0.02590
3010.00	3.3223	1.375	0.049	0.010	0.007	0.02585
3020.00	3.3113	1.375	0.048	0.010	0.007	0.02585
3030.00	3.3003	1.375	0.048	0.010	0.007	0.02580
3040.00	3.2895	1.375	0.048	0.010	0.007	0.02580

Table 9. Kaolin Pellet.

PAGE 7

WN	WL	N	K	DN	DK	R
3050.00	3.2787	1.375	0.048	0.010	0.007	0.02575
3060.00	3.2680	1.375	0.047	0.010	0.007	0.02575
3070.00	3.2573	1.375	0.046	0.010	0.007	0.02575
3080.00	3.2468	1.375	0.046	0.010	0.007	0.02575
3090.00	3.2362	1.375	0.046	0.010	0.007	0.02575
3100.00	3.2258	1.375	0.046	0.010	0.007	0.02575
3110.00	3.2154	1.374	0.045	0.010	0.007	0.02570
3120.00	3.2051	1.375	0.045	0.010	0.007	0.02570
3130.00	3.1949	1.375	0.044	0.010	0.007	0.02575
3140.00	3.1847	1.375	0.044	0.010	0.007	0.02575
3150.00	3.1746	1.375	0.044	0.010	0.007	0.02575
3160.00	3.1646	1.375	0.044	0.010	0.007	0.02575
3170.00	3.1546	1.375	0.044	0.010	0.007	0.02575
3180.00	3.1447	1.375	0.044	0.010	0.007	0.02570
3190.00	3.1348	1.375	0.043	0.010	0.007	0.02570
3200.00	3.1250	1.375	0.043	0.010	0.007	0.02570
3210.00	3.1153	1.375	0.043	0.010	0.007	0.02570
3220.00	3.1056	1.374	0.043	0.010	0.007	0.02565
3230.00	3.0960	1.374	0.042	0.010	0.007	0.02565
3240.00	3.0864	1.374	0.042	0.010	0.007	0.02560
3250.00	3.0769	1.374	0.042	0.010	0.007	0.02560
3260.00	3.0675	1.374	0.041	0.010	0.007	0.02560
3270.00	3.0581	1.374	0.041	0.010	0.007	0.02560
3280.00	3.0488	1.374	0.041	0.010	0.007	0.02555
3290.00	3.0395	1.374	0.041	0.010	0.007	0.02555
3300.00	3.0303	1.374	0.040	0.010	0.007	0.02555
3310.00	3.0211	1.374	0.040	0.010	0.007	0.02555
3320.00	3.0120	1.374	0.040	0.010	0.007	0.02555
3330.00	3.0030	1.374	0.039	0.010	0.007	0.02555
3340.00	2.9940	1.373	0.040	0.010	0.007	0.02550
3350.00	2.9851	1.373	0.038	0.009	0.007	0.02545
3360.00	2.9762	1.374	0.038	0.009	0.007	0.02555
3370.00	2.9674	1.374	0.038	0.009	0.007	0.02555
3380.00	2.9586	1.374	0.038	0.009	0.007	0.02555
3390.00	2.9499	1.374	0.038	0.009	0.007	0.02555
3400.00	2.9412	1.374	0.037	0.009	0.007	0.02555
3410.00	2.9326	1.374	0.037	0.009	0.007	0.02555
3420.00	2.9240	1.374	0.037	0.009	0.007	0.02555
3430.00	2.9155	1.374	0.037	0.009	0.007	0.02555
3440.00	2.9070	1.374	0.037	0.009	0.007	0.02555
3450.00	2.8986	1.374	0.036	0.009	0.007	0.02555
3460.00	2.8902	1.374	0.036	0.009	0.007	0.02555
3470.00	2.8818	1.374	0.036	0.009	0.007	0.02550
3480.00	2.8736	1.374	0.035	0.009	0.007	0.02545
3490.00	2.8653	1.374	0.034	0.009	0.007	0.02545
3500.00	2.8571	1.376	0.033	0.009	0.007	0.02565
3510.00	2.8490	1.376	0.034	0.009	0.007	0.02570
3520.00	2.8409	1.377	0.032	0.009	0.007	0.02580
3530.00	2.8329	1.378	0.034	0.009	0.007	0.02600
3540.00	2.8249	1.379	0.033	0.009	0.007	0.02600

Table 9. Kaolin Pellet.

PAGE 8

WN	WL	N	K	DN	DK	R
3550.00	2.8169	1.381	0.035	0.009	0.007	0.02630
3560.00	2.8090	1.379	0.034	0.009	0.007	0.02610
3570.00	2.8011	1.383	0.032	0.009	0.007	0.02645
3580.00	2.7933	1.386	0.032	0.009	0.007	0.02680
3590.00	2.7855	1.394	0.035	0.009	0.007	0.02780
3600.00	2.7778	1.397	0.040	0.009	0.007	0.02820
3610.00	2.7701	1.424	0.048	0.009	0.008	0.03150
3620.00	2.7624	1.396	0.123	0.010	0.009	0.03040
3630.00	2.7548	1.334	0.077	0.010	0.007	0.02195
3640.00	2.7473	1.353	0.058	0.010	0.007	0.02355
3650.00	2.7397	1.355	0.061	0.010	0.007	0.02380
3660.00	2.7322	1.350	0.061	0.010	0.007	0.02325
3670.00	2.7248	1.346	0.056	0.010	0.007	0.02270
3680.00	2.7174	1.346	0.059	0.010	0.007	0.02285
3690.00	2.7100	1.333	0.067	0.010	0.007	0.02155
3700.00	2.7027	1.306	0.049	0.011	0.006	0.01840
3710.00	2.6954	1.311	0.019	0.010	0.005	0.01855
3720.00	2.6882	1.330	0.008	0.010	0.005	0.02045
3730.00	2.6810	1.336	0.012	0.010	0.005	0.02110
3740.00	2.6738	1.343	0.005	0.009	0.005	0.02190
3750.00	2.6667	1.349	0.011	0.009	0.006	0.02250
3760.00	2.6596	1.349	0.010	0.009	0.006	0.02255
3770.00	2.6525	1.350	0.009	0.009	0.006	0.02265
3780.00	2.6455	1.353	0.008	0.009	0.006	0.02290
3790.00	2.6385	1.355	0.007	0.009	0.006	0.02320
3800.00	2.6316	1.359	0.008	0.009	0.006	0.02360
3810.00	2.6247	1.358	0.012	0.009	0.006	0.02350
3820.00	2.6178	1.358	0.010	0.009	0.006	0.02350
3830.00	2.6110	1.355	0.010	0.009	0.006	0.02320
3840.00	2.6042	1.361	0.008	0.009	0.006	0.02380
3850.00	2.5974	1.358	0.010	0.009	0.006	0.02355
3860.00	2.5907	1.358	0.010	0.009	0.006	0.02355
3870.00	2.5840	1.358	0.008	0.009	0.006	0.02350
3880.00	2.5773	1.357	0.008	0.009	0.006	0.02335
3890.00	2.5707	1.359	0.005	0.009	0.005	0.02365
3900.00	2.5641	1.360	0.005	0.009	0.005	0.02375
3910.00	2.5575	1.360	0.006	0.009	0.006	0.02375
3920.00	2.5510	1.361	0.003	0.009	0.003	0.02385
3930.00	2.5445	1.363	0.006	0.009	0.006	0.02400
3940.00	2.5381	1.361	0.003	0.009	0.003	0.02380
3950.00	2.5316	1.363	0.005	0.009	0.005	0.02400
3960.00	2.5253	1.361	0.005	0.009	0.005	0.02385
3970.00	2.5189	1.361	0.001	0.009	0.001	0.02380
3980.00	2.5126	1.361	0.003	0.009	0.003	0.02385
3990.00	2.5063	1.361	0.000	0.009	0.000	0.02385
4000.00	2.5000	1.362	0.000	0.009	0.000	0.02390

#### 4.10 Illite (K, H<sub>2</sub>O) Al<sub>2</sub> [(OH)<sub>2</sub>/AlSi<sub>3</sub>O<sub>10</sub>]

Illite is a hydromuskovite of clay particles of size  $<2\mu\text{m}$ . Hydromuskovite is an optically biaxial monoclinic crystal with specific gravity in the range 2.6-2.9. For Na light the refractive indices<sup>12</sup> are  $n_x=1.555-1.575$ ,  $n_y=1.577-1.606$ , and  $n_z=1.580-1.610$ . Samples of green shale containing about 85% illite were obtained from Ward's Natural Science Establishment, Rochester, NY. The samples were collected in New York.

Samples were prepared and reflectance spectra obtained by use of procedures similar to those described in Sec. 4.8 for montmorillonite. The reflectance spectrum for a kaolin pellet is presented in Figures 19 and 20. As previously described in Sec. 4.8, the ultraviolet-visible reflectance spectrum of illite also possesses the characteristics of that from an optically rough surface.

Complex refractive index  $n+ik$  spectra were obtained in the infrared region by use of Kramers-Kronig Techniques applied to the infrared reflectance spectrum. Dr. Bruce P. Clayman measured the reflectance spectrum of the same illite pellet for use with the Kramers-Kronig analysis in the  $180-50\text{ cm}^{-1}$  wave-number region (see Sec. 4.8). Spectral values of  $n$  and  $k$  in the infrared for illite are presented in Figure 19 and are listed in Table 10.



ILLITE PELLET

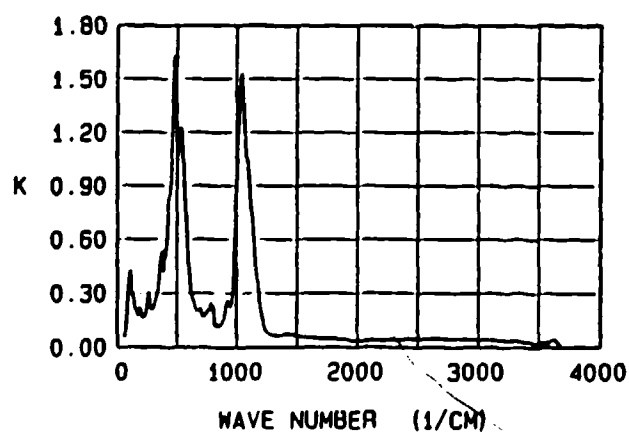
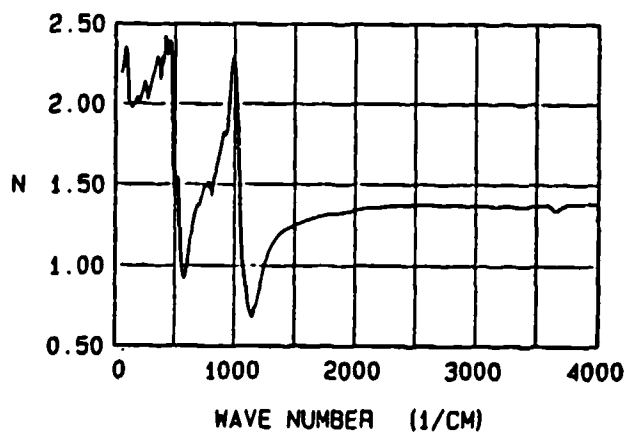
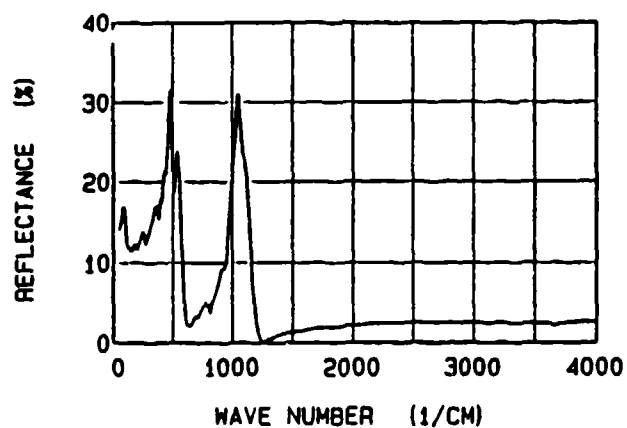


Figure 19. The infrared ( $50\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra for colloidal illite pellet.

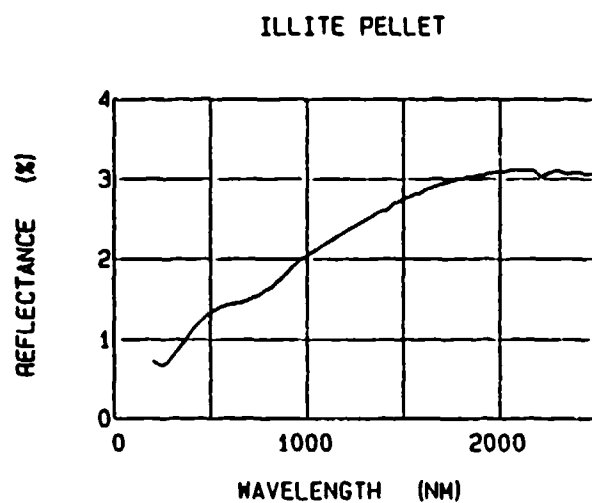


Figure 20. The uv-vis-nir (200-2,500 nm) reflectance spectrum for colloidal illite pellets. .

Table 10. Illite Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
50.00	200.0000	2.188	0.066	0.020	0.042	0.14090
60.00	166.6667	2.217	0.061	0.010	0.044	0.14515
70.00	142.8571	2.274	0.075	0.011	0.047	0.15360
80.00	125.0000	2.352	0.166	0.016	0.051	0.16650
90.00	111.1111	2.313	0.325	0.023	0.049	0.16690
100.00	100.0000	2.187	0.409	0.026	0.043	0.15445
110.00	90.9091	2.028	0.395	0.024	0.036	0.13165
120.00	83.3333	2.002	0.296	0.019	0.035	0.12150
130.00	76.9231	1.993	0.278	0.018	0.035	0.11925
140.00	71.4286	1.972	0.234	0.017	0.034	0.11400
150.00	66.6667	1.986	0.206	0.016	0.034	0.11470
160.00	62.5000	1.995	0.196	0.015	0.034	0.11560
170.00	58.8235	2.018	0.175	0.014	0.035	0.11825
180.00	55.5556	2.041	0.201	0.016	0.036	0.12250
190.00	52.6316	2.009	0.214	0.016	0.035	0.11835
200.00	50.0000	2.001	0.180	0.015	0.035	0.11585
210.00	47.6190	2.034	0.162	0.014	0.036	0.12015
220.00	45.4545	2.057	0.162	0.014	0.037	0.12350
230.00	43.4783	2.085	0.169	0.014	0.038	0.12790
240.00	41.6667	2.120	0.191	0.016	0.040	0.13365
250.00	40.0000	2.132	0.256	0.019	0.041	0.13800
260.00	38.4615	2.079	0.298	0.020	0.038	0.13255
270.00	37.0370	2.027	0.256	0.018	0.036	0.12290
280.00	35.7143	2.058	0.210	0.016	0.037	0.12535
290.00	34.4828	2.096	0.205	0.016	0.039	0.13065
300.00	33.3333	2.134	0.210	0.017	0.041	0.13645
310.00	32.2581	2.171	0.233	0.018	0.042	0.14265
320.00	31.2500	2.197	0.261	0.019	0.044	0.14750
330.00	30.3030	2.226	0.284	0.021	0.045	0.15275
340.00	29.4118	2.274	0.324	0.023	0.047	0.16150
350.00	28.5714	2.291	0.419	0.027	0.048	0.16925
360.00	27.7778	2.256	0.477	0.030	0.046	0.16855
370.00	27.0270	2.196	0.529	0.031	0.043	0.16485
380.00	26.3158	2.159	0.440	0.027	0.042	0.15280
390.00	25.6410	2.298	0.472	0.030	0.048	0.17370
400.00	25.0000	2.245	0.533	0.032	0.045	0.17145
410.00	24.3902	2.376	0.535	0.034	0.052	0.18850
420.00	23.8095	2.414	0.729	0.044	0.052	0.20965
430.00	23.2558	2.322	0.840	0.048	0.046	0.21095
440.00	22.7273	2.310	0.846	0.048	0.045	0.21045
450.00	22.2222	2.390	0.984	0.056	0.047	0.23500
460.00	21.7391	2.372	1.234	0.068	0.040	0.26635
470.00	21.2766	2.119	1.573	0.075	0.017	0.30770
480.00	20.8333	1.630	1.549	0.057	0.013	0.30275
490.00	20.4082	1.428	1.264	0.041	0.010	0.24015
500.00	20.0000	1.460	1.078	0.035	0.005	0.19260
510.00	19.6078	1.540	1.068	0.037	0.007	0.19075
520.00	19.2308	1.499	1.176	0.039	0.006	0.21620
530.00	18.8679	1.326	1.227	0.037	0.012	0.23545
540.00	18.5185	1.125	1.153	0.030	0.015	0.23280

Table 10. Illite Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
550.00	18.1818	1.004	1.000	0.024	0.014	0.20180
560.00	17.8571	0.950	0.856	0.019	0.012	0.16440
570.00	17.5439	0.924	0.719	0.016	0.010	0.12590
580.00	17.2414	0.927	0.590	0.014	0.009	0.08870
590.00	16.9492	0.957	0.471	0.011	0.007	0.05640
600.00	16.6667	1.014	0.376	0.009	0.007	0.03450
610.00	16.3934	1.080	0.313	0.008	0.008	0.02415
620.00	16.1290	1.143	0.278	0.010	0.010	0.02135
630.00	15.8730	1.184	0.261	0.011	0.011	0.02150
640.00	15.6250	1.219	0.235	0.012	0.012	0.02115
650.00	15.3846	1.257	0.213	0.012	0.012	0.02215
660.00	15.1515	1.298	0.199	0.012	0.012	0.02460
670.00	14.9254	1.335	0.199	0.013	0.013	0.02820
680.00	14.7059	1.360	0.203	0.013	0.013	0.03100
690.00	14.4928	1.372	0.216	0.013	0.014	0.03325
700.00	14.2857	1.365	0.196	0.013	0.014	0.03100
710.00	14.0845	1.398	0.171	0.012	0.014	0.03305
720.00	13.8889	1.431	0.169	0.012	0.015	0.03675
730.00	13.6986	1.454	0.174	0.013	0.015	0.03975
740.00	13.5135	1.480	0.180	0.013	0.016	0.04325
750.00	13.3333	1.493	0.201	0.013	0.016	0.04605
760.00	13.1579	1.493	0.203	0.013	0.017	0.04625
770.00	12.9870	1.517	0.213	0.014	0.017	0.04985
780.00	12.8205	1.489	0.245	0.014	0.017	0.04860
790.00	12.6582	1.485	0.214	0.013	0.016	0.04600
800.00	12.5000	1.451	0.225	0.014	0.016	0.04265
810.00	12.3457	1.451	0.131	0.012	0.015	0.03730
820.00	12.1951	1.527	0.114	0.011	0.017	0.04615
830.00	12.0482	1.557	0.126	0.011	0.018	0.05055
840.00	11.9048	1.576	0.120	0.011	0.018	0.05285
850.00	11.7647	1.612	0.113	0.011	0.019	0.05760
860.00	11.6279	1.648	0.116	0.011	0.020	0.06265
870.00	11.4943	1.684	0.124	0.011	0.022	0.06800
880.00	11.3636	1.721	0.136	0.012	0.023	0.07365
890.00	11.2360	1.761	0.149	0.012	0.025	0.07975
900.00	11.1111	1.814	0.187	0.014	0.027	0.08890
910.00	10.9890	1.820	0.248	0.016	0.027	0.09285
920.00	10.8696	1.803	0.257	0.016	0.027	0.09100
930.00	10.7527	1.820	0.239	0.016	0.027	0.09245
940.00	10.6383	1.876	0.222	0.016	0.030	0.09945
950.00	10.5263	1.969	0.227	0.016	0.033	0.11310
960.00	10.4167	2.089	0.280	0.019	0.039	0.13300
970.00	10.3093	2.209	0.399	0.026	0.044	0.15680
980.00	10.2041	2.288	0.591	0.035	0.047	0.18185
990.00	10.1010	2.281	0.807	0.045	0.044	0.20280
1000.00	10.0000	2.214	1.016	0.053	0.037	0.22265
1010.00	9.9010	2.086	1.195	0.057	0.027	0.24040
1020.00	9.8039	1.931	1.348	0.059	0.015	0.26010
1030.00	9.7087	1.711	1.491	0.057	0.008	0.28755
1040.00	9.6154	1.400	1.521	0.048	0.019	0.30905

Table 10. Illite Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
1050.00	9.5238	1.154	1.392	0.037	0.021	0.30100
1060.00	9.4340	1.037	1.239	0.030	0.019	0.27310
1070.00	9.3458	0.976	1.134	0.026	0.017	0.25055
1080.00	9.2593	0.924	1.057	0.023	0.016	0.23590
1090.00	9.1743	0.861	0.997	0.020	0.016	0.23025
1100.00	9.0909	0.790	0.915	0.017	0.015	0.22100
1110.00	9.0090	0.744	0.819	0.015	0.014	0.20140
1120.00	8.9286	0.717	0.730	0.013	0.013	0.17915
1130.00	8.8496	0.695	0.646	0.011	0.012	0.15790
1140.00	8.7719	0.679	0.556	0.010	0.011	0.13465
1150.00	8.6957	0.684	0.452	0.009	0.010	0.10250
1160.00	8.6207	0.739	0.381	0.008	0.009	0.06930
1170.00	8.5470	0.742	0.343	0.008	0.008	0.06000
1180.00	8.4746	0.768	0.269	0.008	0.008	0.04075
1190.00	8.4034	0.808	0.221	0.008	0.008	0.02660
1200.00	8.3333	0.843	0.187	0.008	0.008	0.01790
1210.00	8.2645	0.874	0.152	0.009	0.009	0.01130
1220.00	8.1967	0.910	0.123	0.010	0.011	0.00655
1230.00	8.1301	0.948	0.100	0.010	0.015	0.00340
1240.00	8.0645	0.984	0.088	0.007	0.021	0.00210
1250.00	8.0000	1.017	0.083	0.006	0.024	0.00180
1260.00	7.9365	1.035	0.081	0.010	0.023	0.00190
1270.00	7.8740	1.060	0.068	0.017	0.020	0.00200
1280.00	7.8125	1.084	0.068	0.017	0.015	0.00275
1290.00	7.7519	1.102	0.071	0.017	0.013	0.00360
1300.00	7.6923	1.116	0.066	0.017	0.012	0.00410
1310.00	7.6336	1.132	0.070	0.016	0.011	0.00500
1320.00	7.5758	1.142	0.069	0.015	0.011	0.00555
1330.00	7.5188	1.154	0.066	0.015	0.010	0.00620
1340.00	7.4627	1.165	0.067	0.015	0.010	0.00690
1350.00	7.4074	1.175	0.066	0.014	0.009	0.00755
1360.00	7.3529	1.185	0.067	0.014	0.009	0.00830
1370.00	7.2993	1.194	0.068	0.014	0.009	0.00900
1380.00	7.2464	1.202	0.070	0.013	0.009	0.00960
1390.00	7.1942	1.208	0.072	0.013	0.009	0.01015
1400.00	7.1429	1.213	0.073	0.013	0.009	0.01055
1410.00	7.0922	1.218	0.074	0.013	0.009	0.01100
1420.00	7.0423	1.222	0.074	0.013	0.009	0.01135
1430.00	6.9930	1.226	0.075	0.013	0.010	0.01170
1440.00	6.9444	1.229	0.075	0.013	0.010	0.01195
1450.00	6.8966	1.233	0.074	0.013	0.009	0.01220
1460.00	6.8493	1.235	0.074	0.013	0.009	0.01240
1470.00	6.8027	1.237	0.072	0.013	0.009	0.01255
1480.00	6.7568	1.240	0.071	0.013	0.009	0.01275
1490.00	6.7114	1.244	0.070	0.012	0.009	0.01300
1500.00	6.6667	1.246	0.068	0.012	0.009	0.01315
1510.00	6.6225	1.249	0.066	0.012	0.009	0.01340
1520.00	6.5789	1.252	0.064	0.012	0.009	0.01360
1530.00	6.5359	1.256	0.063	0.012	0.009	0.01390
1540.00	6.4935	1.258	0.061	0.012	0.009	0.01410

Table 10. Illite Pellet.

PAGE 4

WN	WL	N	K	DN	DK	R
1550.00	6.4516	1.262	0.059	0.012	0.009	0.01440
1560.00	6.4103	1.266	0.058	0.012	0.009	0.01470
1570.00	6.3694	1.269	0.057	0.012	0.009	0.01500
1580.00	6.3291	1.273	0.056	0.012	0.009	0.01530
1590.00	6.2893	1.276	0.056	0.012	0.009	0.01560
1600.00	6.2500	1.279	0.055	0.012	0.009	0.01590
1610.00	6.2112	1.282	0.055	0.012	0.009	0.01615
1620.00	6.1728	1.285	0.054	0.012	0.009	0.01640
1630.00	6.1350	1.288	0.054	0.012	0.009	0.01670
1640.00	6.0976	1.290	0.054	0.011	0.009	0.01690
1650.00	6.0606	1.292	0.054	0.011	0.009	0.01715
1660.00	6.0241	1.294	0.054	0.011	0.009	0.01730
1670.00	5.9880	1.296	0.054	0.011	0.010	0.01750
1680.00	5.9524	1.298	0.054	0.011	0.010	0.01770
1690.00	5.9172	1.300	0.053	0.011	0.010	0.01785
1700.00	5.8824	1.302	0.053	0.011	0.010	0.01805
1710.00	5.8480	1.303	0.053	0.011	0.010	0.01820
1720.00	5.8140	1.305	0.053	0.011	0.010	0.01835
1730.00	5.7803	1.306	0.052	0.011	0.010	0.01845
1740.00	5.7471	1.308	0.052	0.011	0.010	0.01865
1750.00	5.7143	1.309	0.051	0.011	0.010	0.01880
1760.00	5.6818	1.310	0.051	0.011	0.010	0.01890
1770.00	5.6497	1.312	0.051	0.011	0.010	0.01905
1780.00	5.6180	1.314	0.050	0.011	0.010	0.01920
1790.00	5.5866	1.315	0.050	0.011	0.010	0.01930
1800.00	5.5556	1.316	0.049	0.011	0.010	0.01945
1810.00	5.5249	1.318	0.049	0.011	0.010	0.01960
1820.00	5.4945	1.319	0.049	0.011	0.010	0.01970
1830.00	5.4645	1.319	0.048	0.011	0.010	0.01975
1840.00	5.4348	1.321	0.048	0.011	0.010	0.01990
1850.00	5.4054	1.322	0.047	0.011	0.010	0.02000
1860.00	5.3763	1.323	0.046	0.011	0.010	0.02010
1870.00	5.3476	1.324	0.046	0.011	0.010	0.02025
1880.00	5.3191	1.325	0.045	0.011	0.010	0.02030
1890.00	5.2910	1.326	0.045	0.011	0.010	0.02040
1900.00	5.2632	1.327	0.044	0.011	0.010	0.02050
1910.00	5.2356	1.329	0.043	0.011	0.010	0.02065
1920.00	5.2083	1.330	0.043	0.011	0.010	0.02075
1930.00	5.1813	1.331	0.042	0.011	0.010	0.02090
1940.00	5.1546	1.333	0.042	0.011	0.010	0.02105
1950.00	5.1282	1.334	0.041	0.011	0.010	0.02115
1960.00	5.1020	1.335	0.040	0.011	0.010	0.02130
1970.00	5.0761	1.337	0.040	0.010	0.010	0.02145
1980.00	5.0505	1.339	0.039	0.010	0.010	0.02165
1990.00	5.0251	1.340	0.039	0.010	0.010	0.02175
2000.00	5.0000	1.341	0.039	0.010	0.010	0.02190
2010.00	4.9751	1.342	0.038	0.010	0.010	0.02205
2020.00	4.9505	.344	0.038	0.010	0.010	0.02220
2030.00	4.9261	.345	0.038	0.010	0.010	0.02235
2040.00	4.9020	1.347	0.038	0.010	0.010	0.02250

Table 10. Illite Pellet.

PAGE 5

WN	WL	N	K	DN	DK	R
2050.00	4.8780	1.348	0.038	0.010	0.010	0.02265
2060.00	4.8544	1.350	0.038	0.010	0.010	0.02285
2070.00	4.8309	1.351	0.038	0.010	0.010	0.02295
2080.00	4.8077	1.352	0.039	0.010	0.010	0.02315
2090.00	4.7847	1.353	0.039	0.010	0.010	0.02325
2100.00	4.7619	1.354	0.039	0.010	0.010	0.02335
2110.00	4.7393	1.355	0.040	0.010	0.010	0.02345
2120.00	4.7170	1.356	0.040	0.010	0.010	0.02355
2130.00	4.6948	1.357	0.040	0.010	0.010	0.02365
2140.00	4.6729	1.358	0.041	0.010	0.010	0.02375
2150.00	4.6512	1.359	0.041	0.010	0.011	0.02385
2160.00	4.6296	1.359	0.041	0.010	0.011	0.02390
2170.00	4.6083	1.360	0.041	0.010	0.011	0.02400
2180.00	4.5872	1.360	0.042	0.010	0.011	0.02405
2190.00	4.5662	1.361	0.042	0.010	0.011	0.02415
2200.00	4.5455	1.361	0.042	0.010	0.011	0.02415
2210.00	4.5249	1.362	0.042	0.010	0.011	0.02425
2220.00	4.5045	1.362	0.042	0.010	0.011	0.02430
2230.00	4.4843	1.363	0.042	0.010	0.011	0.02435
2240.00	4.4643	1.363	0.042	0.010	0.011	0.02440
2250.00	4.4444	1.364	0.043	0.010	0.011	0.02450
2260.00	4.4248	1.365	0.043	0.010	0.011	0.02455
2270.00	4.4053	1.365	0.043	0.010	0.011	0.02460
2280.00	4.3860	1.365	0.043	0.010	0.011	0.02465
2290.00	4.3668	1.366	0.043	0.010	0.011	0.02470
2300.00	4.3478	1.367	0.043	0.010	0.011	0.02480
2310.00	4.3290	1.367	0.043	0.010	0.011	0.02480
2320.00	4.3103	1.367	0.043	0.010	0.011	0.02485
2330.00	4.2918	1.368	0.044	0.010	0.011	0.02495
2340.00	4.2735	1.368	0.043	0.010	0.011	0.02495
2350.00	4.2553	1.369	0.043	0.010	0.011	0.02500
2360.00	4.2373	1.369	0.044	0.010	0.011	0.02510
2370.00	4.2194	1.370	0.043	0.010	0.011	0.02515
2380.00	4.2017	1.371	0.044	0.010	0.011	0.02525
2390.00	4.1841	1.371	0.044	0.010	0.011	0.02530
2400.00	4.1667	1.371	0.044	0.010	0.011	0.02535
2410.00	4.1494	1.372	0.045	0.010	0.011	0.02545
2420.00	4.1322	1.373	0.046	0.010	0.011	0.02550
2430.00	4.1152	1.373	0.046	0.010	0.011	0.02550
2440.00	4.0984	1.373	0.046	0.010	0.011	0.02555
2450.00	4.0816	1.373	0.046	0.010	0.011	0.02555
2460.00	4.0650	1.373	0.048	0.010	0.011	0.02555
2470.00	4.0486	1.373	0.047	0.010	0.011	0.02555
2480.00	4.0323	1.373	0.048	0.010	0.011	0.02555
2490.00	4.0161	1.373	0.048	0.010	0.011	0.02555
2500.00	4.0000	1.373	0.048	0.010	0.011	0.02555
2510.00	3.9841	1.373	0.048	0.010	0.011	0.02555
2520.00	3.9683	1.373	0.043	0.010	0.011	0.02555
2530.00	3.9526	1.373	0.043	0.010	0.011	0.02555
2540.00	3.9370	1.372	0.048	0.010	0.011	0.02550

Table 10. Illite Pellet.

PAGE 6

WN	WL	N	K	DN	DK	R
2550.00	3.9216	1.372	0.047	0.010	0.011	0.02550
2560.00	3.9063	1.372	0.048	0.010	0.011	0.02550
2570.00	3.8911	1.372	0.048	0.010	0.011	0.02550
2580.00	3.8760	1.372	0.047	0.010	0.011	0.02550
2590.00	3.8610	1.373	0.047	0.010	0.011	0.02555
2600.00	3.8462	1.373	0.047	0.010	0.011	0.02560
2610.00	3.8314	1.373	0.047	0.010	0.011	0.02560
2620.00	3.8168	1.374	0.047	0.010	0.011	0.02565
2630.00	3.8023	1.374	0.047	0.010	0.011	0.02570
2640.00	3.7879	1.375	0.0	0.010	0.011	0.02575
2650.00	3.7736	1.375	0.047	0.010	0.011	0.02575
2660.00	3.7594	1.375	0.047	0.010	0.011	0.02575
2670.00	3.7453	1.375	0.048	0.010	0.011	0.02580
2680.00	3.7313	1.375	0.048	0.010	0.011	0.02580
2690.00	3.7175	1.375	0.048	0.010	0.011	0.02580
2700.00	3.7037	1.375	0.048	0.010	0.011	0.02580
2710.00	3.6900	1.375	0.048	0.010	0.011	0.02580
2720.00	3.6765	1.375	0.048	0.010	0.011	0.02585
2730.00	3.6630	1.375	0.049	0.010	0.011	0.02585
2740.00	3.6496	1.375	0.049	0.010	0.011	0.02585
2750.00	3.6364	1.375	0.049	0.010	0.011	0.02585
2760.00	3.6232	1.375	0.050	0.010	0.011	0.02580
2770.00	3.6101	1.375	0.049	0.010	0.011	0.02580
2780.00	3.5971	1.375	0.050	0.010	0.011	0.02580
2790.00	3.5842	1.374	0.050	0.010	0.011	0.02575
2800.00	3.5714	1.374	0.050	0.010	0.011	0.02570
2810.00	3.5587	1.373	0.050	0.010	0.011	0.02565
2820.00	3.5461	1.373	0.050	0.010	0.011	0.02565
2830.00	3.5336	1.372	0.050	0.010	0.011	0.02555
2840.00	3.5211	1.372	0.050	0.010	0.011	0.02550
2850.00	3.5088	1.372	0.050	0.010	0.011	0.02545
2860.00	3.4965	1.372	0.049	0.010	0.011	0.02545
2870.00	3.4843	1.371	0.049	0.010	0.011	0.02540
2880.00	3.4722	1.371	0.048	0.010	0.011	0.02540
2890.00	3.4602	1.371	0.048	0.010	0.011	0.02535
2900.00	3.4483	1.371	0.048	0.010	0.011	0.02535
2910.00	3.4364	1.371	0.048	0.010	0.011	0.02535
2920.00	3.4247	1.371	0.047	0.010	0.011	0.02530
2930.00	3.4130	1.371	0.047	0.010	0.011	0.02530
2940.00	3.4014	1.371	0.047	0.010	0.011	0.02530
2950.00	3.3898	1.370	0.047	0.010	0.011	0.02525
2960.00	3.3784	1.370	0.046	0.010	0.011	0.02525
2970.00	3.3670	1.370	0.046	0.010	0.011	0.02525
2980.00	3.3557	1.370	0.046	0.010	0.011	0.02525
2990.00	3.3445	1.370	0.046	0.010	0.011	0.02525
3000.00	3.3333	1.370	0.046	0.010	0.011	0.02520
3010.00	3.3223	1.370	0.045	0.010	0.011	0.02520
3020.00	3.3113	1.370	0.045	0.010	0.011	0.02520
3030.00	3.3003	1.370	0.045	0.010	0.011	0.02515
3040.00	3.2895	1.370	0.044	0.010	0.011	0.02515



Table 10. Illite Pellet.

PAGE 7

WN	WL	N	K	DN	DK	R
3050.00	3.2787	1.369	0.045	0.010	0.011	0.02510
3060.00	3.2680	1.369	0.044	0.010	0.011	0.02510
3070.00	3.2573	1.369	0.044	0.010	0.011	0.02510
3080.00	3.2468	1.369	0.043	0.010	0.011	0.02510
3090.00	3.2362	1.369	0.043	0.010	0.011	0.02505
3100.00	3.2258	1.369	0.043	0.010	0.011	0.02505
3110.00	3.2154	1.369	0.042	0.010	0.011	0.02508
3120.00	3.2051	1.369	0.042	0.010	0.011	0.02508
3130.00	3.1949	1.369	0.042	0.010	0.011	0.02508
3140.00	3.1847	1.369	0.042	0.010	0.011	0.02508
3150.00	3.1746	1.369	0.042	0.010	0.011	0.02508
3160.00	3.1646	1.369	0.041	0.010	0.011	0.02500
3170.00	3.1546	1.369	0.041	0.010	0.011	0.02500
3180.00	3.1447	1.368	0.041	0.010	0.011	0.02495
3190.00	3.1348	1.368	0.040	0.010	0.011	0.02495
3200.00	3.1250	1.368	0.040	0.010	0.011	0.02495
3210.00	3.1153	1.369	0.040	0.010	0.011	0.02495
3220.00	3.1056	1.369	0.040	0.010	0.011	0.02495
3230.00	3.0960	1.368	0.040	0.010	0.011	0.02490
3240.00	3.0864	1.368	0.039	0.010	0.011	0.02490
3250.00	3.0769	1.368	0.040	0.010	0.011	0.02485
3260.00	3.0675	1.368	0.039	0.010	0.011	0.02485
3270.00	3.0581	1.367	0.039	0.010	0.011	0.02480
3280.00	3.0488	1.367	0.039	0.010	0.011	0.02475
3290.00	3.0395	1.367	0.038	0.010	0.011	0.02470
3300.00	3.0303	1.366	0.037	0.010	0.011	0.02465
3310.00	3.0211	1.366	0.037	0.010	0.011	0.02465
3320.00	3.0120	1.366	0.036	0.010	0.011	0.02460
3330.00	3.0030	1.365	0.036	0.010	0.011	0.02455
3340.00	2.9940	1.366	0.035	0.010	0.011	0.02455
3350.00	2.9851	1.365	0.034	0.010	0.011	0.02450
3360.00	2.9762	1.365	0.034	0.010	0.011	0.02450
3370.00	2.9674	1.365	0.033	0.010	0.010	0.02450
3380.00	2.9586	1.365	0.033	0.010	0.010	0.02450
3390.00	2.9499	1.365	0.032	0.010	0.010	0.02450
3400.00	2.9412	1.365	0.031	0.010	0.010	0.02450
3410.00	2.9326	1.366	0.030	0.010	0.010	0.02450
3420.00	2.9240	1.366	0.030	0.010	0.010	0.02455
3430.00	2.9155	1.366	0.030	0.010	0.010	0.02455
3440.00	2.9070	1.366	0.029	0.010	0.010	0.02455
3450.00	2.8986	1.367	0.028	0.010	0.010	0.02460
3460.00	2.8902	1.367	0.028	0.010	0.010	0.02465
3470.00	2.8818	1.367	0.028	0.010	0.010	0.02465
3480.00	2.8736	1.368	0.027	0.010	0.010	0.02470
3490.00	2.8653	1.368	0.026	0.010	0.010	0.02475
3500.00	2.8571	1.369	0.027	0.010	0.010	0.02490
3510.00	2.8490	1.368	0.028	0.010	0.010	0.02475
3520.00	2.8409	1.370	0.024	0.010	0.010	0.02490
3530.00	2.8329	1.369	0.028	0.010	0.010	0.02490
3540.00	2.8249	1.370	0.023	0.010	0.010	0.02490

Table 10. Illite Pellet.

PAGE 8

WN	WL	N	K	DN	DK	R
3550.00	2.8169	1.373	0.027	0.010	0.011	0.02535
3560.00	2.8090	1.371	0.029	0.010	0.011	0.02505
3570.00	2.8011	1.372	0.026	0.010	0.010	0.02515
3580.00	2.7933	1.376	0.027	0.010	0.011	0.02560
3590.00	2.7855	1.378	0.034	0.010	0.011	0.02600
3600.00	2.7778	1.372	0.041	0.010	0.011	0.02535
3610.00	2.7701	1.367	0.041	0.010	0.011	0.02485
3620.00	2.7624	1.360	0.046	0.010	0.011	0.02405
3630.00	2.7548	1.352	0.041	0.010	0.010	0.02315
3640.00	2.7473	1.342	0.037	0.010	0.010	0.02195
3650.00	2.7397	1.340	0.023	0.010	0.010	0.02165
3660.00	2.7322	1.341	0.021	0.010	0.010	0.02175
3670.00	2.7248	1.340	0.009	0.010	0.009	0.02155
3680.00	2.7174	1.346	0.005	0.009	0.005	0.02215
3690.00	2.7100	1.350	0.000	0.009	0.002	0.02265
3700.00	2.7027	1.356	0.000	0.009	0.003	0.02325
3710.00	2.6954	1.360	0.000	0.009	0.006	0.02375
3720.00	2.6882	1.367	0.000	0.009	0.005	0.02445
3730.00	2.6810	1.368	0.000	0.009	0.002	0.02460
3740.00	2.6738	1.370	0.000	0.009	0.007	0.02485
3750.00	2.6667	1.379	0.000	0.009	0.004	0.02585
3760.00	2.6596	1.377	0.002	0.009	0.002	0.02565
3770.00	2.6525	1.378	0.001	0.009	0.001	0.02580
3780.00	2.6455	1.378	0.003	0.009	0.003	0.02580
3790.00	2.6385	1.378	0.005	0.009	0.005	0.02580
3800.00	2.6316	1.379	0.002	0.009	0.002	0.02585
3810.00	2.6247	1.381	0.006	0.009	0.006	0.02605
3820.00	2.6178	1.382	0.002	0.009	0.002	0.02615
3830.00	2.6110	1.378	0.010	0.009	0.010	0.02575
3840.00	2.6042	1.380	0.002	0.009	0.002	0.02595
3850.00	2.5974	1.381	0.005	0.009	0.005	0.02610
3860.00	2.5907	1.382	0.007	0.009	0.007	0.02625
3870.00	2.5840	1.382	0.004	0.009	0.004	0.02620
3880.00	2.5773	1.381	0.008	0.009	0.008	0.02615
3890.00	2.5707	1.381	0.006	0.009	0.006	0.02610
3900.00	2.5641	1.380	0.004	0.009	0.004	0.02600
3910.00	2.5575	1.384	0.007	0.009	0.007	0.02645
3920.00	2.5510	1.381	0.005	0.009	0.005	0.02605
3930.00	2.5445	1.385	0.004	0.009	0.004	0.02650
3940.00	2.5381	1.385	0.007	0.009	0.007	0.02655
3950.00	2.5316	1.385	0.008	0.009	0.008	0.02655
3960.00	2.5253	1.383	0.010	0.009	0.010	0.02630
3970.00	2.5189	1.380	0.007	0.009	0.007	0.02595
3980.00	2.5126	1.382	0.005	0.009	0.005	0.02620
3990.00	2.5063	1.381	0.006	0.009	0.006	0.02605
4000.00	2.5000	1.381	0.004	0.009	0.004	0.02605

#### 4.11 Composite Clay Pellet

We also prepared a minimum of 10 pellets from a composite mixture of one-third by weight of colloidal montmorillonite, kaolin, and illite by placing the mixture between polished stainless steel rams and applying a pressure of 0.67 GPa. Reflectance spectra of the pellets were acquired using the procedure described in Secs. 4.1, 4.2, or 4.3. The reflectance spectrum for a composite clay pellet is presented in Figures 21 and 22. The ultraviolet-visible reflectance spectrum in Figure 22 also shows the characteristics of that from an optically rough surface. The far-infrared spectrum, Figure 21, in the  $180\text{--}50\text{ cm}^{-1}$  wave-number region was acquired for the same composite clay by Dr. Bruce P. Clayman (see Sec. 4.8).

Complex refractive index spectra were computed in the infrared by applying Kramers-Kronig analysis to the infrared reflectance spectrum. Spectral values of  $n$  and  $k$  are presented graphically in Figure 21 and are listed in Table 11.

# COMPOSITE CLAY PELLET

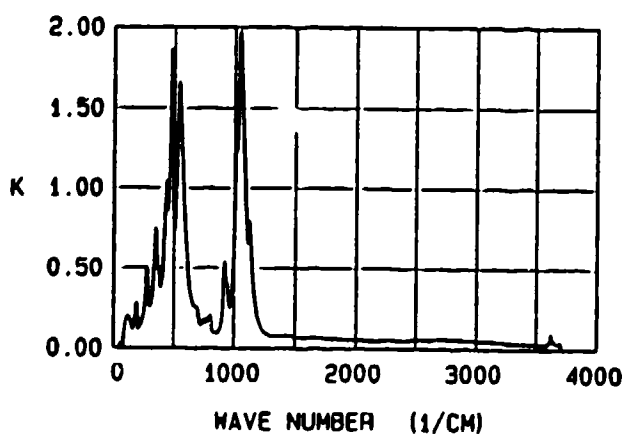
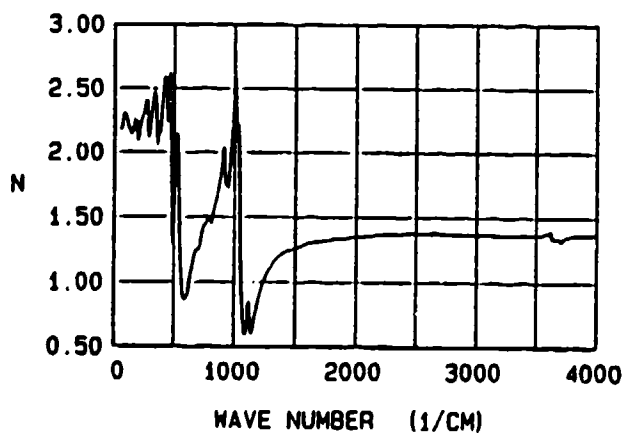
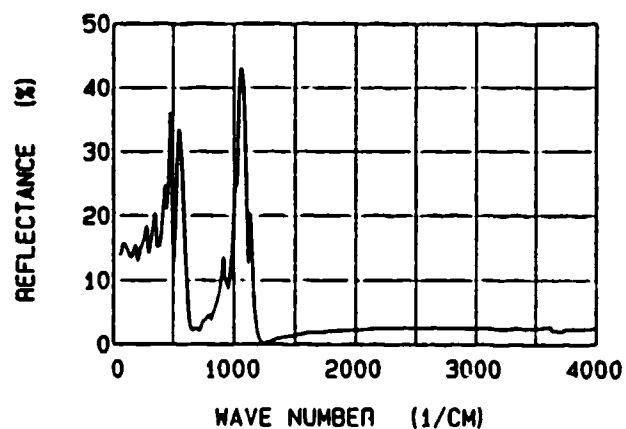


Figure 21. The infrared (50-4,000  $\text{cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra for composite colloidal clay pellets . . . . .

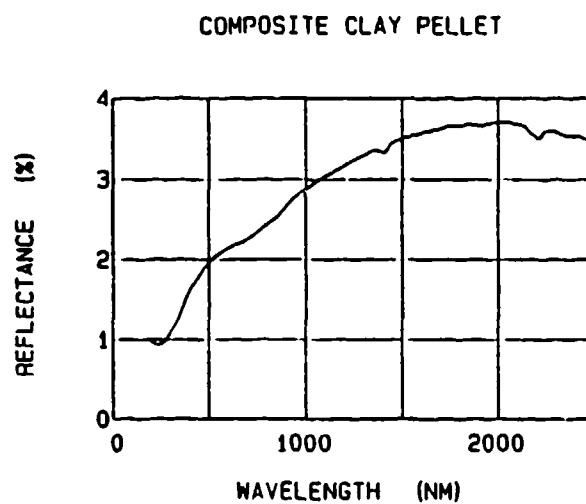


Figure 22. The uv-vis-nir (200-2,500 nm) reflectance spectrum for composite colloidal clay pellets . . . . .

Table 11. Composite Clay Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
50.00	200.0000	2.191	0.029	0.018	0.029	0.14105
60.00	166.6667	2.178	0.011	0.007	0.011	0.13910
70.00	142.8571	2.225	0.000	0.008	0.017	0.14600
80.00	125.0000	2.294	0.028	0.008	0.028	0.15605
90.00	111.1111	2.305	0.097	0.011	0.037	0.15835
100.00	100.0000	2.282	0.155	0.013	0.036	0.15615
110.00	90.9091	2.245	0.186	0.014	0.035	0.15175
120.00	83.3333	2.202	0.198	0.014	0.034	0.14595
130.00	76.9231	2.168	0.196	0.014	0.032	0.14090
140.00	71.4286	2.145	0.171	0.013	0.031	0.13680
150.00	66.6667	2.142	0.142	0.012	0.031	0.13555
160.00	62.5000	2.175	0.111	0.011	0.032	0.13960
170.00	58.8235	2.220	0.125	0.011	0.034	0.14655
180.00	55.5556	2.260	0.181	0.014	0.036	0.15370
190.00	52.6316	2.205	0.281	0.017	0.034	0.14965
200.00	50.0000	2.092	0.196	0.013	0.030	0.12980
210.00	47.6190	2.163	0.113	0.011	0.032	0.13785
220.00	45.4545	2.221	0.127	0.012	0.034	0.14665
230.00	43.4783	2.253	0.143	0.012	0.035	0.15170
240.00	41.6667	2.288	0.169	0.013	0.037	0.15750
250.00	40.0000	2.326	0.201	0.015	0.038	0.16380
260.00	38.4615	2.382	0.249	0.017	0.041	0.17330
270.00	37.0370	2.408	0.398	0.023	0.042	0.18375
280.00	35.7143	2.181	0.492	0.024	0.033	0.15980
290.00	34.4828	2.144	0.306	0.017	0.032	0.14215
300.00	33.3333	2.228	0.257	0.016	0.035	0.15185
310.00	32.2581	2.314	0.268	0.017	0.038	0.16450
320.00	31.2500	2.397	0.325	0.020	0.041	0.17845
330.00	30.3030	2.472	0.448	0.025	0.044	0.19515
340.00	29.4118	2.428	0.638	0.032	0.042	0.20330
350.00	28.5714	2.134	0.729	0.031	0.030	0.17750
360.00	27.7778	2.116	0.496	0.023	0.031	0.16150
370.00	27.0270	2.148	0.496	0.023	0.032	0.15575
380.00	26.3158	2.167	0.405	0.021	0.033	0.15140
390.00	25.6410	2.312	0.381	0.021	0.038	0.16975
400.00	25.0000	2.410	0.428	0.024	0.042	0.18580
410.00	24.3902	2.565	0.576	0.031	0.048	0.21530
420.00	23.8095	2.587	0.791	0.040	0.047	0.23520
430.00	23.2558	2.439	1.043	0.047	0.038	0.24675
440.00	22.7273	2.226	0.913	0.038	0.031	0.20990
450.00	22.2222	2.425	0.888	0.041	0.039	0.22720
460.00	21.7391	2.620	1.215	0.058	0.043	0.28345
470.00	21.2766	2.162	1.863	0.068	0.007	0.36040
480.00	20.8333	1.409	1.564	0.038	0.016	0.31940
490.00	20.4082	1.333	0.979	0.022	0.006	0.16915
500.00	20.0000	1.632	0.729	0.022	0.014	0.12645
510.00	19.6078	1.906	0.758	0.028	0.022	0.15645
520.00	19.2308	2.116	0.993	0.038	0.026	0.21075
530.00	18.8679	2.067	1.403	0.050	0.016	0.27550
540.00	18.5185	1.663	1.659	0.047	0.013	0.32680

Table 11. Composite Clay Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
550.00	18.1818	1.272	1.552	0.035	0.018	0.33060
560.00	17.8571	1.069	1.367	0.026	0.017	0.30760
570.00	17.5439	0.936	1.181	0.020	0.015	0.27495
580.00	17.2414	0.877	0.991	0.016	0.012	0.22435
590.00	16.9492	0.865	0.833	0.014	0.010	0.17335
600.00	16.6667	0.879	0.699	0.012	0.009	0.12740
610.00	16.3934	0.891	0.591	0.010	0.008	0.09380
620.00	16.1290	0.927	0.466	0.009	0.007	0.05795
630.00	15.8730	1.002	0.379	0.007	0.007	0.03535
640.00	15.6250	1.070	0.334	0.006	0.007	0.02710
650.00	15.3846	1.119	0.297	0.007	0.009	0.02290
660.00	15.1515	1.169	0.272	0.009	0.010	0.02190
670.00	14.9254	1.219	0.260	0.010	0.010	0.02360
680.00	14.7059	1.243	0.260	0.010	0.010	0.02535
690.00	14.4928	1.254	0.257	0.010	0.011	0.02585
700.00	14.2857	1.247	0.221	0.010	0.011	0.02200
710.00	14.0845	1.280	0.170	0.011	0.010	0.02100
720.00	13.8889	1.337	0.145	0.011	0.010	0.02500
730.00	13.6986	1.383	0.144	0.011	0.011	0.03000
740.00	13.5135	1.426	0.157	0.011	0.012	0.03550
750.00	13.3333	1.439	0.175	0.011	0.012	0.03805
760.00	13.1579	1.443	0.170	0.011	0.012	0.03815
770.00	12.9870	1.475	0.157	0.011	0.013	0.04140
780.00	12.8205	1.493	0.182	0.011	0.013	0.04495
790.00	12.6582	1.502	0.188	0.011	0.013	0.04645
800.00	12.5000	1.465	0.200	0.012	0.013	0.04270
810.00	12.3457	1.469	0.119	0.010	0.012	0.03900
820.00	12.1951	1.531	0.099	0.010	0.013	0.04625
830.00	12.0482	1.572	0.098	0.010	0.014	0.05165
840.00	11.9048	1.607	0.098	0.010	0.015	0.05645
850.00	11.7647	1.646	0.092	0.010	0.016	0.06170
860.00	11.6279	1.695	0.095	0.010	0.017	0.06870
870.00	11.4943	1.743	0.102	0.010	0.018	0.07580
880.00	11.3636	1.797	0.121	0.010	0.020	0.08410
890.00	11.2360	1.870	0.139	0.011	0.022	0.09535
900.00	11.1111	1.979	0.206	0.013	0.026	0.11375
910.00	10.9890	2.036	0.438	0.021	0.028	0.13610
920.00	10.8696	1.802	0.532	0.020	0.021	0.11540
930.00	10.7527	1.743	0.427	0.017	0.020	0.09670
940.00	10.6383	1.741	0.407	0.017	0.020	0.09440
950.00	10.5263	1.743	0.309	0.015	0.020	0.08615
960.00	10.4167	1.863	0.250	0.014	0.023	0.09905
970.00	10.3093	2.006	0.260	0.015	0.027	0.12010
980.00	10.2041	2.169	0.326	0.018	0.033	0.14675
990.00	10.1010	2.355	0.455	0.024	0.040	0.18005
1000.00	10.0000	2.592	0.795	0.040	0.047	0.23610
1010.00	9.9010	2.307	1.350	0.055	0.027	0.27910
1020.00	9.8039	2.089	1.223	0.045	0.021	0.24515
1030.00	9.7087	2.214	1.639	0.062	0.016	0.32210
1040.00	9.6154	1.590	1.973	0.054	0.024	0.40250

Table 11. Composite Clay Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
1050.00	9.5238	1.120	1.809	0.036	0.028	0.42590
1060.00	9.4340	0.849	1.571	0.024	0.025	0.42605
1070.00	9.3458	0.692	1.337	0.017	0.021	0.40815
1080.00	9.2593	0.612	1.110	0.013	0.017	0.36425
1090.00	9.1743	0.595	0.904	0.010	0.013	0.29550
1100.00	9.0909	0.653	0.712	0.009	0.010	0.19690
1110.00	9.0090	0.828	0.660	0.011	0.009	0.12560
1120.00	8.9286	0.761	0.792	0.012	0.011	0.18665
1130.00	8.8496	0.619	0.671	0.008	0.010	0.19745
1140.00	8.7719	0.603	0.513	0.007	0.009	0.15225
1150.00	8.6957	0.644	0.389	0.006	0.007	0.10030
1160.00	8.6207	0.715	0.311	0.006	0.007	0.06040
1170.00	8.5470	0.754	0.267	0.006	0.007	0.04300
1180.00	8.4746	0.798	0.214	0.007	0.007	0.02725
1190.00	8.4034	0.850	0.179	0.007	0.007	0.01625
1200.00	8.3333	0.889	0.160	0.008	0.009	0.01085
1210.00	8.2645	0.925	0.137	0.008	0.011	0.00675
1220.00	8.1967	0.956	0.123	0.008	0.014	0.00455
1230.00	8.1301	0.989	0.108	0.005	0.018	0.00305
1240.00	8.0645	1.016	0.106	0.004	0.019	0.00290
1250.00	8.0000	1.044	0.097	0.009	0.019	0.00275
1260.00	7.9365	1.061	0.091	0.012	0.018	0.00290
1270.00	7.8740	1.079	0.089	0.013	0.016	0.00335
1280.00	7.8125	1.098	0.086	0.014	0.014	0.00395
1290.00	7.7519	1.115	0.080	0.015	0.012	0.00450
1300.00	7.6923	1.130	0.079	0.015	0.011	0.00525
1310.00	7.6336	1.144	0.079	0.014	0.010	0.00600
1320.00	7.5758	1.157	0.078	0.014	0.010	0.00675
1330.00	7.5188	1.169	0.078	0.014	0.009	0.00750
1340.00	7.4627	1.179	0.079	0.013	0.009	0.00825
1350.00	7.4074	1.189	0.079	0.013	0.009	0.00890
1360.00	7.3529	1.197	0.079	0.013	0.009	0.00950
1370.00	7.2993	1.204	0.079	0.013	0.009	0.01010
1380.00	7.2464	1.211	0.080	0.013	0.008	0.01060
1390.00	7.1942	1.217	0.079	0.013	0.008	0.01105
1400.00	7.1429	1.224	0.078	0.012	0.008	0.01160
1410.00	7.0922	1.230	0.079	0.012	0.008	0.01210
1420.00	7.0423	1.235	0.079	0.012	0.008	0.01255
1430.00	6.9930	1.240	0.080	0.012	0.008	0.01300
1440.00	6.9444	1.243	0.081	0.012	0.008	0.01330
1450.00	6.8966	1.246	0.081	0.012	0.008	0.01355
1460.00	6.8493	1.249	0.080	0.012	0.008	0.01375
1470.00	6.8027	1.252	0.078	0.012	0.008	0.01395
1480.00	6.7568	1.255	0.076	0.012	0.008	0.01415
1490.00	6.7114	1.258	0.074	0.012	0.008	0.01445
1500.00	6.6667	1.262	0.072	0.012	0.008	0.01475
1510.00	6.6225	1.266	0.071	0.012	0.008	0.01510
1520.00	6.5789	1.270	0.070	0.012	0.008	0.01540
1530.00	6.5359	1.274	0.069	0.011	0.008	0.01570
1540.00	6.4935	1.278	0.068	0.011	0.008	0.01605



Table 11. Composite Clay Pellet.

PAGE 4

WN	WL	N	K	DN	DK	R
1550.00	6.4516	1.281	0.067	0.011	0.008	0.01640
1560.00	6.4103	1.285	0.066	0.011	0.008	0.01675
1570.00	6.3694	1.289	0.066	0.011	0.008	0.01710
1580.00	6.3291	1.293	0.066	0.011	0.008	0.01745
1590.00	6.2893	1.297	0.067	0.011	0.008	0.01785
1600.00	6.2500	1.299	0.067	0.011	0.008	0.01815
1610.00	6.2112	1.302	0.068	0.011	0.008	0.01840
1620.00	6.1728	1.304	0.069	0.011	0.008	0.01865
1630.00	6.1350	1.305	0.070	0.011	0.008	0.01880
1640.00	6.0976	1.306	0.070	0.011	0.008	0.01890
1650.00	6.0606	1.308	0.070	0.011	0.008	0.01905
1660.00	6.0241	1.309	0.070	0.011	0.008	0.01915
1670.00	5.9880	1.310	0.069	0.011	0.008	0.01925
1680.00	5.9524	1.310	0.069	0.011	0.008	0.01930
1690.00	5.9172	1.312	0.067	0.011	0.008	0.01940
1700.00	5.8824	1.313	0.066	0.011	0.008	0.01950
1710.00	5.8480	1.315	0.065	0.011	0.008	0.01965
1720.00	5.8140	1.317	0.064	0.011	0.008	0.01985
1730.00	5.7803	1.319	0.063	0.011	0.008	0.02005
1740.00	5.7471	1.322	0.063	0.011	0.008	0.02030
1750.00	5.7143	1.323	0.063	0.011	0.008	0.02045
1760.00	5.6818	1.324	0.063	0.011	0.008	0.02060
1770.00	5.6497	1.326	0.062	0.011	0.008	0.02070
1780.00	5.6180	1.327	0.062	0.011	0.008	0.02080
1790.00	5.5866	1.328	0.061	0.011	0.008	0.02095
1800.00	5.5556	1.330	0.061	0.011	0.008	0.02115
1810.00	5.5249	1.332	0.061	0.011	0.008	0.02130
1820.00	5.4945	1.333	0.061	0.011	0.008	0.02150
1830.00	5.4645	1.334	0.062	0.011	0.008	0.02160
1840.00	5.4348	1.335	0.062	0.011	0.008	0.02170
1850.00	5.4054	1.336	0.062	0.010	0.008	0.02175
1860.00	5.3763	1.336	0.061	0.010	0.008	0.02180
1870.00	5.3476	1.337	0.060	0.010	0.008	0.02185
1880.00	5.3191	1.338	0.059	0.010	0.008	0.02190
1890.00	5.2910	1.339	0.059	0.010	0.008	0.02205
1900.00	5.2632	1.340	0.058	0.010	0.008	0.02215
1910.00	5.2356	1.341	0.058	0.010	0.008	0.02225
1920.00	5.2083	1.342	0.057	0.010	0.008	0.02235
1930.00	5.1813	1.343	0.057	0.010	0.008	0.02245
1940.00	5.1546	1.344	0.057	0.010	0.008	0.02255
1950.00	5.1282	1.346	0.057	0.010	0.008	0.02270
1960.00	5.1020	1.346	0.057	0.010	0.009	0.02280
1970.00	5.0761	1.347	0.056	0.010	0.009	0.02285
1980.00	5.0505	1.348	0.056	0.010	0.009	0.02295
1990.00	5.0251	1.348	0.055	0.010	0.009	0.02300
2000.00	5.0000	1.349	0.055	0.010	0.008	0.02305
2010.00	4.9751	1.350	0.054	0.010	0.008	0.02310
2020.00	4.9505	1.351	0.053	0.010	0.008	0.02320
2030.00	4.9261	1.352	0.053	0.010	0.008	0.02330
2040.00	4.9020	1.353	0.053	0.010	0.009	0.02345

Table 11. Composite Clay Pellet.

PAGE 5

WN	WL	N	K	DN	DK	R
2050.00	4.8780	1.354	0.052	0.010	0.009	0.02355
2060.00	4.8544	1.355	0.052	0.010	0.009	0.02370
2070.00	4.8309	1.356	0.052	0.010	0.009	0.02380
2080.00	4.8077	1.357	0.052	0.010	0.009	0.02385
2090.00	4.7847	1.357	0.052	0.010	0.009	0.02390
2100.00	4.7619	1.358	0.052	0.010	0.009	0.02395
2110.00	4.7393	1.358	0.051	0.010	0.009	0.02400
2120.00	4.7170	1.359	0.050	0.010	0.009	0.02410
2130.00	4.6948	1.360	0.049	0.010	0.009	0.02420
2140.00	4.6729	1.362	0.049	0.010	0.009	0.02435
2150.00	4.6512	1.363	0.049	0.010	0.009	0.02450
2160.00	4.6296	1.365	0.049	0.010	0.009	0.02470
2170.00	4.6083	1.366	0.049	0.010	0.009	0.02485
2180.00	4.5872	1.368	0.050	0.010	0.009	0.02500
2190.00	4.5662	1.368	0.050	0.010	0.009	0.02510
2200.00	4.5455	1.369	0.051	0.010	0.009	0.02520
2210.00	4.5249	1.370	0.051	0.010	0.009	0.02525
2220.00	4.5045	1.370	0.051	0.010	0.009	0.02530
2230.00	4.4843	1.370	0.051	0.010	0.009	0.02535
2240.00	4.4643	1.371	0.051	0.010	0.009	0.02545
2250.00	4.4444	1.372	0.051	0.010	0.009	0.02555
2260.00	4.4248	1.373	0.052	0.010	0.009	0.02565
2270.00	4.4053	1.374	0.052	0.010	0.009	0.02575
2280.00	4.3860	1.374	0.053	0.010	0.009	0.02580
2290.00	4.3668	1.374	0.054	0.010	0.009	0.02585
2300.00	4.3478	1.374	0.054	0.010	0.009	0.02585
2310.00	4.3290	1.374	0.054	0.010	0.009	0.02585
2320.00	4.3103	1.374	0.055	0.010	0.009	0.02580
2330.00	4.2918	1.375	0.054	0.010	0.009	0.02590
2340.00	4.2735	1.374	0.055	0.010	0.009	0.02585
2350.00	4.2553	1.374	0.055	0.010	0.009	0.02585
2360.00	4.2373	1.374	0.054	0.010	0.009	0.02580
2370.00	4.2194	1.374	0.053	0.010	0.009	0.02580
2380.00	4.2017	1.375	0.052	0.010	0.009	0.02585
2390.00	4.1841	1.376	0.052	0.010	0.009	0.02600
2400.00	4.1667	1.377	0.052	0.010	0.009	0.02615
2410.00	4.1494	1.378	0.052	0.010	0.009	0.02625
2420.00	4.1322	1.379	0.053	0.010	0.009	0.02635
2430.00	4.1152	1.379	0.054	0.010	0.009	0.02640
2440.00	4.0984	1.380	0.054	0.010	0.009	0.02645
2450.00	4.0816	1.380	0.055	0.010	0.009	0.02645
2460.00	4.0650	1.380	0.055	0.010	0.009	0.02650
2470.00	4.0486	1.381	0.055	0.010	0.009	0.02660
2480.00	4.0323	1.381	0.057	0.010	0.009	0.02660
2490.00	4.0161	1.380	0.058	0.010	0.009	0.02660
2500.00	4.0000	1.379	0.058	0.010	0.009	0.02650
2510.00	3.9841	1.379	0.057	0.010	0.009	0.02640
2520.00	3.9683	1.378	0.057	0.010	0.009	0.02635
2530.00	3.9526	1.378	0.056	0.010	0.009	0.02635
2540.00	3.9370	1.379	0.056	0.010	0.009	0.02640

Table 11. Composite Clay Pellet.

PAGE 6

WN	WL	N	K	DN	DK	R
2550.00	3.9216	1.380	0.056	0.010	0.009	0.02650
2560.00	3.9063	1.381	0.056	0.010	0.009	0.02660
2570.00	3.8911	1.381	0.057	0.010	0.009	0.02660
2580.00	3.8760	1.380	0.057	0.010	0.009	0.02660
2590.00	3.8610	1.380	0.057	0.010	0.009	0.02660
2600.00	3.8462	1.380	0.058	0.010	0.009	0.02660
2610.00	3.8314	1.380	0.058	0.010	0.009	0.02660
2620.00	3.8168	1.380	0.058	0.010	0.009	0.02660
2630.00	3.8023	1.381	0.058	0.010	0.009	0.02665
2640.00	3.7879	1.380	0.059	0.010	0.009	0.02660
2650.00	3.7736	1.380	0.059	0.010	0.009	0.02660
2660.00	3.7594	1.380	0.059	0.010	0.009	0.02660
2670.00	3.7453	1.380	0.060	0.010	0.009	0.02660
2680.00	3.7313	1.380	0.060	0.010	0.009	0.02655
2690.00	3.7175	1.379	0.061	0.010	0.009	0.02650
2700.00	3.7037	1.378	0.061	0.010	0.009	0.02640
2710.00	3.6900	1.377	0.060	0.010	0.009	0.02630
2720.00	3.6765	1.377	0.060	0.010	0.009	0.02625
2730.00	3.6630	1.377	0.059	0.010	0.009	0.02625
2740.00	3.6496	1.377	0.059	0.010	0.009	0.02625
2750.00	3.6364	1.378	0.059	0.010	0.009	0.02630
2760.00	3.6232	1.377	0.060	0.010	0.009	0.02630
2770.00	3.6101	1.377	0.060	0.010	0.009	0.02630
2780.00	3.5971	1.377	0.061	0.010	0.009	0.02625
2790.00	3.5842	1.376	0.061	0.010	0.009	0.02615
2800.00	3.5714	1.375	0.061	0.010	0.009	0.02605
2810.00	3.5587	1.374	0.061	0.010	0.009	0.02595
2820.00	3.5461	1.373	0.061	0.010	0.009	0.02585
2830.00	3.5336	1.372	0.061	0.010	0.009	0.02575
2840.00	3.5211	1.372	0.060	0.010	0.009	0.02570
2850.00	3.5088	1.371	0.060	0.010	0.009	0.02560
2860.00	3.4965	1.370	0.059	0.010	0.009	0.02550
2870.00	3.4843	1.370	0.058	0.010	0.009	0.02540
2880.00	3.4722	1.369	0.058	0.010	0.009	0.02530
2890.00	3.4602	1.368	0.057	0.010	0.009	0.02520
2900.00	3.4483	1.368	0.055	0.010	0.009	0.02515
2910.00	3.4364	1.368	0.054	0.010	0.009	0.02515
2920.00	3.4247	1.369	0.053	0.010	0.009	0.02520
2930.00	3.4130	1.369	0.053	0.010	0.009	0.02525
2940.00	3.4014	1.370	0.052	0.010	0.009	0.02530
2950.00	3.3898	1.370	0.052	0.010	0.009	0.02535
2960.00	3.3784	1.370	0.052	0.010	0.009	0.02535
2970.00	3.3670	1.370	0.053	0.010	0.009	0.02535
2980.00	3.3557	1.370	0.052	0.010	0.009	0.02530
2990.00	3.3445	1.370	0.051	0.010	0.009	0.02525
3000.00	3.3333	1.370	0.051	0.010	0.009	0.02525
3010.00	3.3223	1.370	0.050	0.010	0.009	0.02525
3020.00	3.3113	1.370	0.050	0.010	0.009	0.02530
3030.00	3.3003	1.370	0.050	0.010	0.009	0.02530
3040.00	3.2895	1.371	0.050	0.010	0.009	0.02535

Table 11. Composite Clay Pellet.

PAGE 7

WN	WL	N	K	DN	DK	R
3050.00	3.2787	1.370	0.050	0.010	0.009	0.02530
3060.00	3.2680	1.370	0.050	0.010	0.009	0.02530
3070.00	3.2573	1.370	0.050	0.010	0.009	0.02525
3080.00	3.2468	1.370	0.051	0.010	0.009	0.02525
3090.00	3.2362	1.369	0.050	0.010	0.009	0.02520
3100.00	3.2258	1.369	0.050	0.010	0.009	0.02520
3110.00	3.2154	1.369	0.050	0.010	0.009	0.02515
3120.00	3.2051	1.368	0.050	0.010	0.009	0.02505
3130.00	3.1949	1.367	0.050	0.010	0.009	0.02490
3140.00	3.1847	1.366	0.049	0.010	0.009	0.02480
3150.00	3.1746	1.365	0.048	0.010	0.009	0.02470
3160.00	3.1646	1.365	0.046	0.010	0.009	0.02465
3170.00	3.1546	1.365	0.045	0.010	0.009	0.02465
3180.00	3.1447	1.366	0.044	0.010	0.009	0.02470
3190.00	3.1348	1.367	0.044	0.010	0.009	0.02480
3200.00	3.1250	1.367	0.044	0.010	0.009	0.02485
3210.00	3.1153	1.367	0.044	0.010	0.009	0.02485
3220.00	3.1056	1.367	0.044	0.010	0.009	0.02480
3230.00	3.0960	1.367	0.044	0.010	0.009	0.02480
3240.00	3.0864	1.366	0.043	0.010	0.008	0.02475
3250.00	3.0769	1.366	0.042	0.010	0.008	0.02475
3260.00	3.0675	1.367	0.042	0.010	0.008	0.02480
3270.00	3.0581	1.367	0.042	0.010	0.008	0.02485
3280.00	3.0488	1.367	0.042	0.010	0.008	0.02480
3290.00	3.0395	1.366	0.042	0.010	0.008	0.02475
3300.00	3.0303	1.366	0.042	0.010	0.008	0.02465
3310.00	3.0211	1.366	0.041	0.010	0.008	0.02465
3320.00	3.0120	1.365	0.041	0.010	0.008	0.02460
3330.00	3.0030	1.365	0.040	0.010	0.008	0.02455
3340.00	2.9940	1.365	0.039	0.010	0.008	0.02455
3350.00	2.9851	1.365	0.039	0.010	0.008	0.02455
3360.00	2.9762	1.365	0.038	0.010	0.008	0.02455
3370.00	2.9674	1.365	0.038	0.010	0.008	0.02455
3380.00	2.9586	1.365	0.037	0.010	0.008	0.02455
3390.00	2.9499	1.365	0.037	0.010	0.008	0.02455
3400.00	2.9412	1.366	0.036	0.010	0.008	0.02460
3410.00	2.9326	1.366	0.036	0.010	0.008	0.02460
3420.00	2.9240	1.366	0.036	0.010	0.008	0.02465
3430.00	2.9155	1.366	0.036	0.010	0.008	0.02460
3440.00	2.9070	1.365	0.035	0.010	0.008	0.02455
3450.00	2.8986	1.365	0.035	0.010	0.008	0.02450
3460.00	2.8902	1.365	0.034	0.010	0.008	0.02450
3470.00	2.8818	1.365	0.033	0.010	0.008	0.02450
3480.00	2.8736	1.366	0.032	0.010	0.008	0.02455
3490.00	2.8653	1.366	0.032	0.010	0.008	0.02460
3500.00	2.8571	1.367	0.032	0.010	0.008	0.02465
3510.00	2.8490	1.368	0.031	0.010	0.008	0.02475
3520.00	2.8409	1.369	0.031	0.010	0.008	0.02485
3530.00	2.8329	1.369	0.031	0.010	0.008	0.02490
3540.00	2.8249	1.369	0.031	0.010	0.008	0.02490

Table 11. Composite Clay Pellet.

PAGE 8

WN	WL	N	K	DN	DK	R
3550.00	2.8169	1.370	0.030	0.010	0.008	0.02495
3560.00	2.8090	1.371	0.030	0.010	0.008	0.02515
3570.00	2.8011	1.375	0.030	0.010	0.008	0.02550
3580.00	2.7933	1.378	0.032	0.010	0.008	0.02595
3590.00	2.7855	1.380	0.037	0.010	0.009	0.02625
3600.00	2.7778	1.380	0.040	0.010	0.009	0.02630
3610.00	2.7701	1.393	0.045	0.010	0.009	0.02785
3620.00	2.7624	1.377	0.094	0.010	0.010	0.02715
3630.00	2.7548	1.335	0.058	0.010	0.008	0.02155
3640.00	2.7473	1.347	0.048	0.010	0.008	0.02270
3650.00	2.7397	1.345	0.049	0.010	0.008	0.02245
3660.00	2.7322	1.338	0.041	0.010	0.008	0.02160
3670.00	2.7248	1.342	0.040	0.010	0.008	0.02200
3680.00	2.7174	1.339	0.037	0.010	0.008	0.02170
3690.00	2.7100	1.336	0.043	0.010	0.008	0.02145
3700.00	2.7027	1.313	0.028	0.010	0.007	0.01885
3710.00	2.6954	1.325	0.008	0.010	0.007	0.01995
3720.00	2.6882	1.335	0.002	0.009	0.002	0.02100
3730.00	2.6810	1.343	0.001	0.009	0.001	0.02185
3740.00	2.6738	1.349	0.002	0.009	0.002	0.02245
3750.00	2.6667	1.351	0.002	0.009	0.002	0.02275
3760.00	2.6596	1.354	0.003	0.009	0.003	0.02300
3770.00	2.6525	1.355	0.002	0.009	0.002	0.02320
3780.00	2.6455	1.357	0.002	0.009	0.002	0.02335
3790.00	2.6385	1.359	0.002	0.009	0.002	0.02360
3800.00	2.6316	1.362	0.002	0.009	0.002	0.02395
3810.00	2.6247	1.364	0.004	0.009	0.004	0.02415
3820.00	2.6178	1.363	0.006	0.009	0.006	0.02405
3830.00	2.6110	1.361	0.005	0.009	0.005	0.02380
3840.00	2.6042	1.361	0.003	0.009	0.003	0.02385
3850.00	2.5974	1.365	0.002	0.009	0.002	0.02425
3860.00	2.5907	1.367	0.004	0.009	0.004	0.02445
3870.00	2.5840	1.366	0.006	0.009	0.006	0.02435
3880.00	2.5773	1.363	0.004	0.009	0.004	0.02410
3890.00	2.5707	1.364	0.003	0.009	0.003	0.02420
3900.00	2.5641	1.366	0.002	0.009	0.002	0.02435
3910.00	2.5575	1.367	0.002	0.009	0.002	0.02445
3920.00	2.5510	1.368	0.002	0.009	0.002	0.02460
3930.00	2.5445	1.368	0.003	0.009	0.003	0.02460
3940.00	2.5381	1.369	0.003	0.009	0.003	0.02470
3950.00	2.5316	1.367	0.004	0.009	0.004	0.02455
3960.00	2.5253	1.367	0.003	0.009	0.003	0.02450
3970.00	2.5189	1.367	0.002	0.009	0.002	0.02450
3980.00	2.5126	1.367	0.001	0.009	0.001	0.02455
3990.00	2.5063	1.367	0.002	0.009	0.002	0.02455
4000.00	2.5000	1.366	0.001	0.009	0.001	0.02440

#### 4.12 Diesel Soot

The optical properties of three samples of Diesel soot were investigated. Two of the samples were provided by Prof. Stromberg, Dept. of Physics, New Mexico State University. The two NMSU samples were collected from the open burning of Diesel fuel. One sample, referred to hereafter as NMSU heated soot, was heated to about 320°C for about one-half hour to drive off any unburned hydrocarbons; the other, NMSU unheated soot, was the Diesel soot as collected. The third sample, UMKC soot, was collected from open burning of Diesel fuel in a burner that was constructed at UMKC.

Pellets of the three Diesel soots were prepared using the same procedure described in Section 4.8 for montmorillonite. It was very difficult to prepare pellets with seemingly specular surfaces. However, after numerous attempts a pellet was obtained for each of the three samples.

Near normal incidence (6.5 deg) reflectance spectra of the three pellets were acquired in the 180-4,000  $\text{cm}^{-1}$  region of the infrared, and for the two NMSU samples reflectance spectra were acquired in the 220-2,500 nm region of the uv-vis-nir. The UMKC soot pellet which was very fragile, was damaged during the process of acquiring the uv-nir spectra.

Complex refractive indices were obtained for the three samples by application of Kramers-Kronig methods to the reflectance spectra. We could not find in the scientific

literature any information about the optical properties of soots in the vacuum ultraviolet spectral region; thus the KK analysis was made without extrapolation of the reflectance spectra into the vacuum ultraviolet. The values of  $n$  and  $k$ , therefore are probably in error in the uv-vis regions. The reflectance spectra and resultant values of  $n+ik$  are presented in Figs. 23-27 and in Tables 12-14.

In the infrared spectral region the optical properties of compressed propane soot pellets were investigated by Felske et al.<sup>13</sup> and those for pressed disks of black powders were investigated by Tomaselli et al.<sup>14</sup> In the visible region C.E. Batten<sup>15</sup> reported on the optical properties of kerosene soot pellets. In the listing below we compare various values of  $n$  and  $k$  from this study with those from previous investigations by Felske et al.

$\lambda$	NMSU (U) <sup>a</sup>		UMKC <sup>a</sup>		NMSU (H) <sup>a</sup>		Felske <sup>b</sup>	
( $\mu\text{m}$ )	n	k	n	k	n	k	n	k
0.45	1.56	0.26			1.46	0.23	1.59	0.27
2.0	1.91	0.35			1.77	0.31	2.07	0.63
3.0	2.02	0.34	1.99	0.32	1.87	0.29	2.05	0.57
4.0	2.08	0.33	2.04	0.31	1.92	0.28	2.09	0.53
4.5	2.10	0.32	2.06	0.31	1.94	0.28	2.10	0.57
5.0	2.11	0.33	2.07	0.31	1.94	0.28	2.12	0.53
6.0	2.12	0.32	2.07	0.31	1.94	0.28	2.13	0.64
7.0	2.16	0.36	2.11	0.34	1.99	0.31	2.20	0.68
8.0	2.21	0.39	2.16	0.37	2.03	0.31	2.34	0.74
9.0	2.26	0.38	2.22	0.36	2.08	0.33	2.31	0.74
10.0	2.29	0.36	2.25	0.34	2.11	0.31	2.30	0.80

a. This investigation; b. Felske et al.<sup>13</sup> ("effective values").

Note, at 0.45  $\mu\text{m}$  we agree very well with Felske et al. for both n and k, and in the region 2-10  $\mu\text{m}$  n is in good agreement but values of k from Felske et al. are a factor of two greater than our values for k. Values of n for lampblack from Tomaselli et al.<sup>14</sup> were 0.3-0.4 less than those listed above, while their k values tend to agree with those of Felske et al.

We also note the Felske et al. used 30,000 psi, Tomaselli et al. used 4,000 psi, and we used 87,000 psi or 109,000 psi to press the soot into pellets.



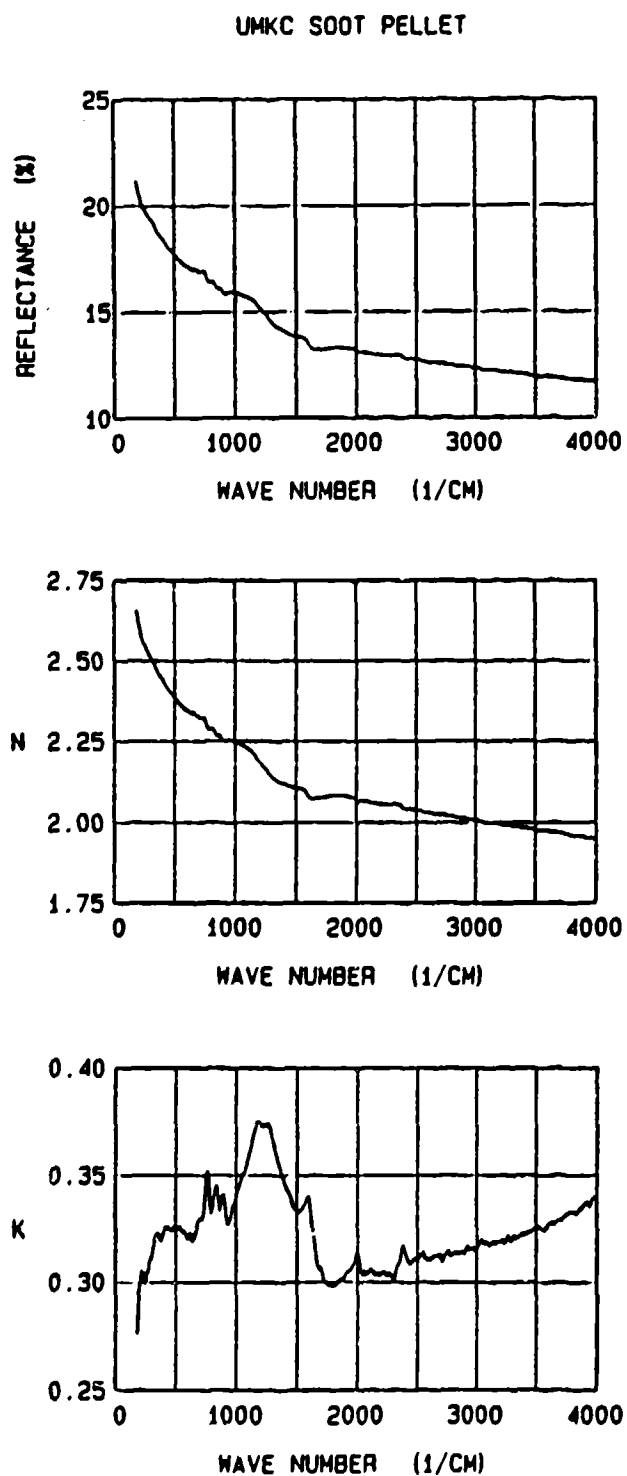


Figure 23. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of (UMKC) Diesel soot pellet .

# NMSU UNHEATED SOOT PELLET

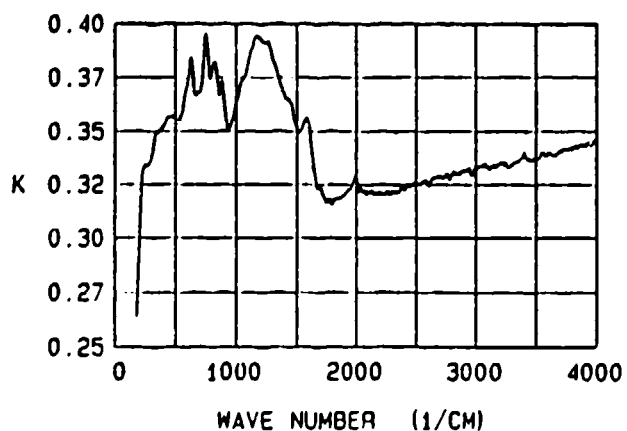
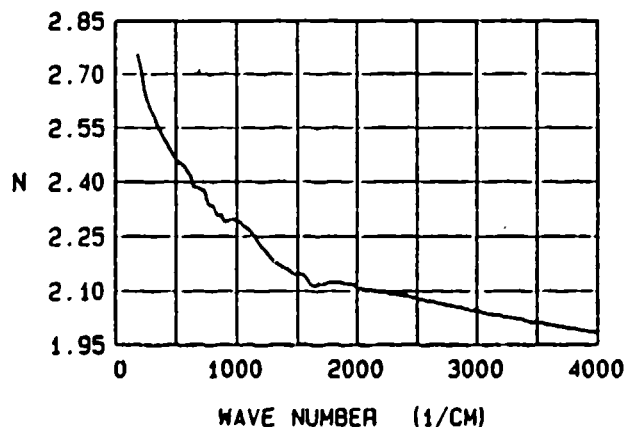
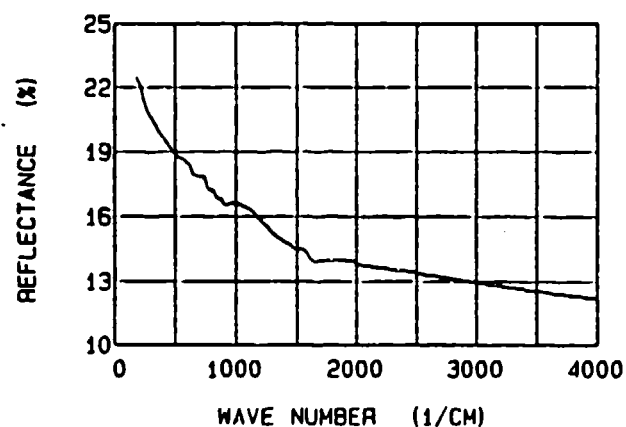


Figure 24. The infrared (180-4,000  $\text{cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of (NMSU) unheated Diesel soot pellet .

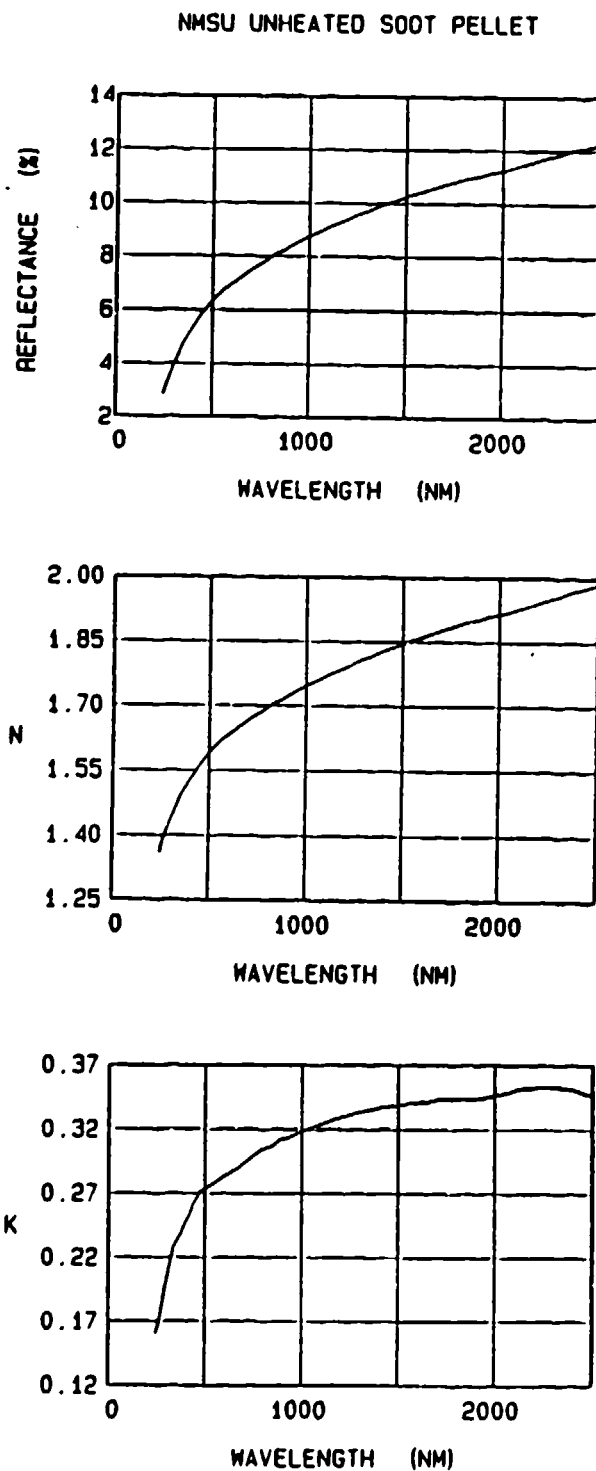


Figure 25. The uv-vis-nir (220-2,500 nm) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of (NMSU) unheated Diesel soot pellet.

# NMSU HEATED SOOT PELLET

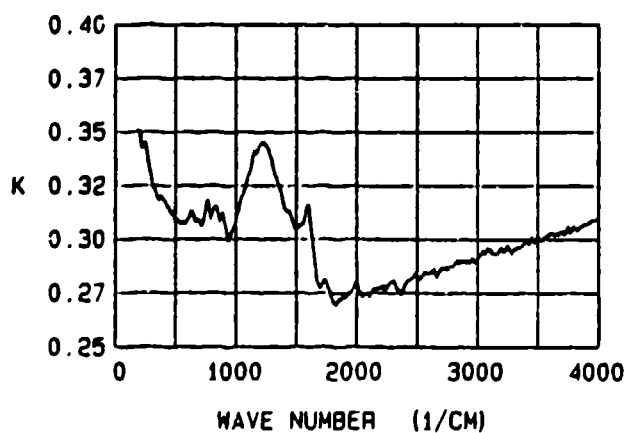
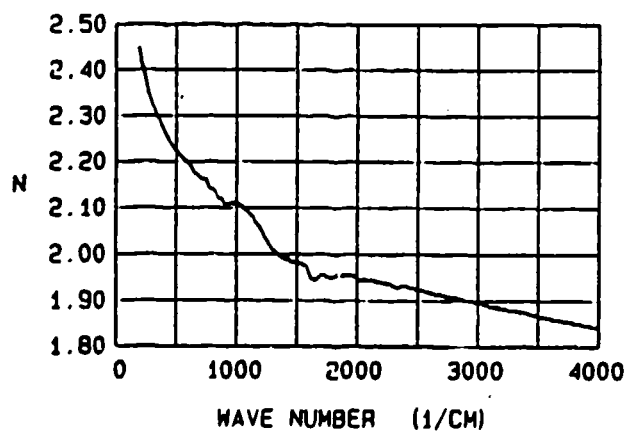
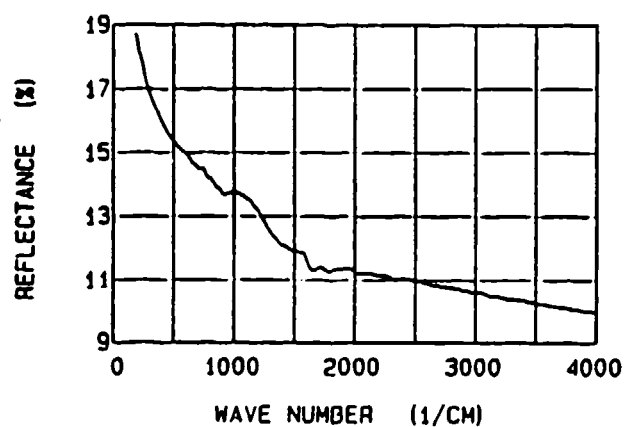


Figure 26. The infrared (180-4,000  $\text{cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of (NMSU) heated Diesel soot pellet.

# NMSU HEATED SOOT PELLET

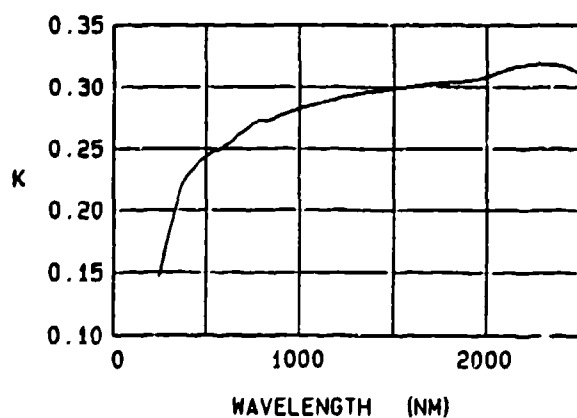
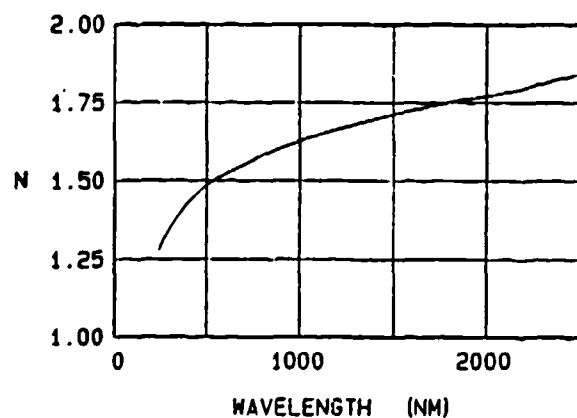
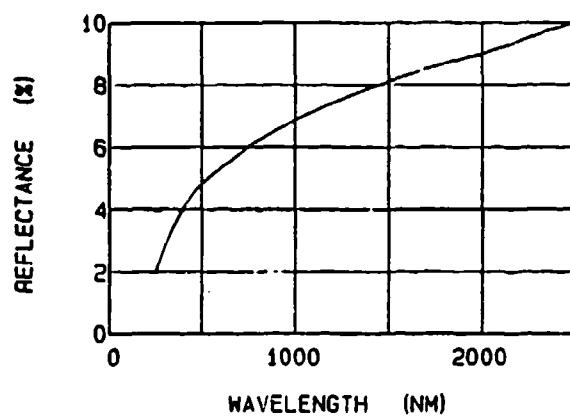


Figure 27. The uv-vis-nir (220-2,500 nm) reflectance, refractive index N, and extinction coefficient K spectra of (NMSU) heated Diesel soot pellet.

Table 12. NMSU Diesel Soot Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	2.754	0.264	0.090	0.032	0.22420
200.00	50.0000	2.731	0.295	0.085	0.035	0.22221
220.00	45.4545	2.697	0.323	0.083	0.038	0.21879
240.00	41.6667	2.660	0.333	0.081	0.039	0.21421
260.00	38.4615	2.631	0.334	0.079	0.039	0.21056
280.00	35.7143	2.612	0.334	0.078	0.038	0.20800
300.00	33.3333	2.597	0.336	0.077	0.039	0.20605
320.00	31.2500	2.583	0.342	0.076	0.039	0.20439
340.00	29.4118	2.564	0.349	0.075	0.040	0.20224
360.00	27.7778	2.546	0.349	0.074	0.040	0.19988
380.00	26.3158	2.533	0.351	0.073	0.040	0.19815
400.00	25.0000	2.519	0.353	0.072	0.040	0.19641
420.00	23.8095	2.508	0.354	0.072	0.040	0.19494
440.00	22.7273	2.494	0.356	0.071	0.040	0.19321
460.00	21.7391	2.482	0.357	0.070	0.040	0.19166
480.00	20.8333	2.470	0.357	0.069	0.040	0.18996
500.00	20.0000	2.461	0.355	0.069	0.039	0.18864
520.00	19.2308	2.454	0.354	0.068	0.039	0.18768
540.00	18.5185	2.449	0.357	0.068	0.039	0.18715
560.00	17.8571	2.444	0.361	0.068	0.040	0.18666
580.00	17.2414	2.435	0.368	0.068	0.040	0.18589
600.00	16.6667	2.425	0.373	0.067	0.041	0.18471
620.00	16.1290	2.412	0.383	0.067	0.042	0.18348
640.00	15.6250	2.388	0.378	0.065	0.041	0.18000
660.00	15.1515	2.386	0.367	0.065	0.040	0.17909
680.00	14.7059	2.383	0.367	0.065	0.040	0.17874
700.00	14.2857	2.379	0.368	0.064	0.040	0.17815
720.00	13.8889	2.378	0.373	0.064	0.040	0.17833
740.00	13.5135	2.370	0.390	0.064	0.042	0.17814
760.00	13.1579	2.342	0.391	0.063	0.042	0.17439
780.00	12.8205	2.333	0.376	0.062	0.040	0.17235
800.00	12.5000	2.334	0.377	0.062	0.040	0.17255
820.00	12.1951	2.321	0.382	0.062	0.041	0.17110
840.00	11.9048	2.307	0.375	0.061	0.040	0.16875
860.00	11.6279	2.307	0.366	0.060	0.039	0.16819
880.00	11.3636	2.300	0.373	0.060	0.039	0.16759
900.00	11.1111	2.288	0.362	0.059	0.038	0.16541
920.00	10.8696	2.290	0.353	0.059	0.037	0.16510
940.00	10.6383	2.294	0.351	0.059	0.037	0.16569
960.00	10.4167	2.296	0.355	0.059	0.038	0.16605
980.00	10.2041	2.295	0.358	0.059	0.038	0.16620
1000.00	10.0000	2.292	0.363	0.059	0.038	0.16601
1020.00	9.8039	2.289	0.367	0.059	0.039	0.16585
1040.00	9.6154	2.283	0.373	0.059	0.039	0.16532
1060.00	9.4340	2.277	0.374	0.059	0.039	0.16455
1080.00	9.2593	2.274	0.376	0.059	0.039	0.16422
1100.00	9.0909	2.269	0.381	0.059	0.040	0.16386
1120.00	8.9286	2.261	0.386	0.058	0.040	0.16306
1140.00	8.7719	2.254	0.389	0.058	0.040	0.16230
1160.00	8.6207	2.244	0.394	0.058	0.041	0.16123

Table 12. NMSU Diesel Soot Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
1180.00	8.4746	2.234	0.393	0.057	0.041	0.15985
1200.00	8.3333	2.225	0.393	0.057	0.040	0.15859
1220.00	8.1967	2.217	0.392	0.056	0.040	0.15739
1240.00	8.0645	2.210	0.391	0.056	0.040	0.15645
1260.00	7.9365	2.202	0.391	0.055	0.040	0.15534
1280.00	7.8125	2.192	0.389	0.055	0.040	0.15376
1300.00	7.6923	2.185	0.383	0.054	0.039	0.15240
1320.00	7.5758	2.179	0.380	0.054	0.039	0.15140
1340.00	7.4627	2.173	0.376	0.054	0.038	0.15035
1360.00	7.3529	2.170	0.372	0.053	0.038	0.14963
1380.00	7.2464	2.165	0.369	0.053	0.037	0.14884
1400.00	7.1429	2.162	0.365	0.053	0.037	0.14819
1420.00	7.0423	2.160	0.365	0.053	0.037	0.14779
1440.00	6.9444	2.154	0.363	0.052	0.037	0.14695
1460.00	6.8493	2.148	0.359	0.052	0.036	0.14581
1480.00	6.7568	2.146	0.353	0.051	0.036	0.14520
1500.00	6.6667	2.146	0.350	0.051	0.036	0.14500
1520.00	6.5789	2.146	0.349	0.051	0.035	0.14486
1540.00	6.4935	2.145	0.351	0.051	0.036	0.14495
1560.00	6.4103	2.141	0.354	0.051	0.036	0.14454
1580.00	6.3291	2.133	0.356	0.051	0.036	0.14354
1600.00	6.2500	2.122	0.353	0.050	0.035	0.14182
1620.00	6.1728	2.115	0.343	0.050	0.034	0.14020
1640.00	6.0976	2.114	0.333	0.049	0.034	0.13948
1660.00	6.0241	2.115	0.326	0.049	0.033	0.13920
1680.00	5.9524	2.120	0.323	0.049	0.033	0.13969
1700.00	5.8824	2.120	0.323	0.049	0.033	0.13969
1720.00	5.8140	2.119	0.320	0.049	0.032	0.13944
1740.00	5.7471	2.121	0.316	0.049	0.032	0.13951
1760.00	5.6818	2.123	0.317	0.049	0.032	0.13990
1780.00	5.6180	2.122	0.317	0.049	0.032	0.13966
1800.00	5.5556	2.125	0.316	0.049	0.032	0.14001
1820.00	5.4945	2.123	0.318	0.049	0.032	0.13995
1840.00	5.4348	2.123	0.318	0.049	0.032	0.13990
1860.00	5.3763	2.124	0.319	0.049	0.032	0.14001
1880.00	5.3191	2.122	0.319	0.049	0.032	0.13989
1900.00	5.2632	2.122	0.320	0.049	0.032	0.13989
1920.00	5.2083	2.120	0.322	0.049	0.033	0.13974
1940.00	5.1546	2.118	0.323	0.049	0.033	0.13950
1960.00	5.1020	2.118	0.324	0.049	0.033	0.13955
1980.00	5.0505	2.115	0.328	0.049	0.033	0.13931
2000.00	5.0000	2.107	0.327	0.049	0.033	0.13815
2020.00	4.9505	2.108	0.321	0.049	0.032	0.13790
2040.00	4.9020	2.106	0.322	0.049	0.032	0.13767
2060.00	4.8544	2.105	0.321	0.048	0.032	0.13750
2080.00	4.8077	2.103	0.321	0.048	0.032	0.13730
2100.00	4.7619	2.103	0.321	0.048	0.032	0.13730
2120.00	4.7170	2.102	0.322	0.048	0.032	0.13714
2140.00	4.6729	2.100	0.321	0.048	0.032	0.13679
2160.00	4.6296	2.100	0.321	0.048	0.032	0.13675

Table 12. NMSU Diesel Soot Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
2180.00	4.5872	2.098	0.321	0.048	0.032	0.13649
2200.00	4.5455	2.097	0.320	0.048	0.032	0.13630
2220.00	4.5045	2.096	0.320	0.048	0.032	0.13618
2240.00	4.4643	2.095	0.321	0.048	0.032	0.13606
2260.00	4.4248	2.093	0.321	0.048	0.032	0.13580
2280.00	4.3860	2.093	0.320	0.048	0.032	0.13574
2300.00	4.3478	2.091	0.322	0.048	0.032	0.13560
2320.00	4.3103	2.090	0.321	0.048	0.032	0.13540
2340.00	4.2735	2.089	0.321	0.048	0.032	0.13525
2360.00	4.2373	2.089	0.322	0.048	0.032	0.13531
2380.00	4.2017	2.086	0.323	0.048	0.032	0.13500
2400.00	4.1667	2.086	0.322	0.048	0.032	0.13495
2420.00	4.1322	2.084	0.325	0.048	0.033	0.13479
2440.00	4.0984	2.082	0.324	0.047	0.032	0.13446
2460.00	4.0650	2.081	0.324	0.047	0.032	0.13434
2480.00	4.0323	2.080	0.326	0.047	0.033	0.13435
2500.00	4.0000	2.076	0.326	0.047	0.033	0.13379
2520.00	3.9683	2.077	0.325	0.047	0.032	0.13376
2540.00	3.9370	2.076	0.326	0.047	0.033	0.13366
2560.00	3.9063	2.075	0.326	0.047	0.033	0.13354
2580.00	3.8760	2.071	0.326	0.047	0.033	0.13301
2600.00	3.8462	2.071	0.325	0.047	0.032	0.13289
2620.00	3.8168	2.071	0.327	0.047	0.033	0.13311
2640.00	3.7879	2.069	0.328	0.047	0.033	0.13281
2660.00	3.7594	2.067	0.328	0.047	0.033	0.13255
2680.00	3.7313	2.066	0.328	0.047	0.033	0.13241
2700.00	3.7037	2.063	0.328	0.047	0.033	0.13208
2720.00	3.6765	2.062	0.328	0.047	0.033	0.13189
2740.00	3.6496	2.062	0.329	0.047	0.033	0.13189
2760.00	3.6232	2.058	0.329	0.046	0.033	0.13141
2780.00	3.5971	2.059	0.328	0.047	0.033	0.13151
2800.00	3.5714	2.058	0.331	0.047	0.033	0.13150
2820.00	3.5461	2.056	0.330	0.046	0.033	0.13114
2840.00	3.5211	2.054	0.330	0.046	0.033	0.13088
2860.00	3.4965	2.053	0.329	0.046	0.033	0.13070
2880.00	3.4722	2.052	0.331	0.046	0.033	0.13060
2900.00	3.4483	2.050	0.332	0.046	0.033	0.13039
2920.00	3.4247	2.049	0.331	0.046	0.033	0.13026
2940.00	3.4014	2.047	0.333	0.046	0.033	0.13000
2960.00	3.3784	2.045	0.329	0.046	0.033	0.12954
2980.00	3.3557	2.048	0.330	0.046	0.033	0.13000
3000.00	3.3333	2.045	0.333	0.046	0.033	0.12975
3020.00	3.3113	2.043	0.333	0.046	0.033	0.12945
3040.00	3.2895	2.041	0.334	0.046	0.033	0.12928
3060.00	3.2680	2.039	0.333	0.046	0.033	0.12903
3080.00	3.2468	2.037	0.334	0.046	0.033	0.12872
3100.00	3.2258	2.036	0.333	0.046	0.033	0.12844
3120.00	3.2051	2.035	0.332	0.045	0.033	0.12837
3140.00	3.1847	2.034	0.334	0.045	0.033	0.12831
3160.00	3.1646	2.032	0.333	0.045	0.033	0.12800



Table 12. NMSU Diesel Soot Pellet.

PAGE 4

WN	WL	N	K	DN	DK	R
3180.00	3.1447	2.032	0.334	0.045	0.033	0.12802
3200.00	3.1250	2.030	0.335	0.045	0.033	0.12784
3220.00	3.1056	2.028	0.334	0.045	0.033	0.12748
3240.00	3.0864	2.026	0.335	0.045	0.033	0.12725
3260.00	3.0675	2.026	0.333	0.045	0.033	0.12709
3280.00	3.0488	2.026	0.333	0.045	0.033	0.12714
3300.00	3.0303	2.025	0.334	0.045	0.033	0.12709
3320.00	3.0120	2.024	0.335	0.045	0.033	0.12689
3340.00	2.9940	2.022	0.335	0.045	0.033	0.12675
3360.00	2.9762	2.021	0.336	0.045	0.033	0.12665
3380.00	2.9586	2.021	0.337	0.045	0.033	0.12665
3400.00	2.9412	2.017	0.339	0.045	0.033	0.12620
3420.00	2.9240	2.015	0.337	0.045	0.033	0.12580
3440.00	2.9070	2.014	0.337	0.045	0.033	0.12570
3460.00	2.8902	2.014	0.336	0.045	0.033	0.12559
3480.00	2.8736	2.013	0.337	0.045	0.033	0.12561
3500.00	2.8571	2.012	0.337	0.045	0.033	0.12536
3520.00	2.8409	2.012	0.337	0.045	0.033	0.12535
3540.00	2.8249	2.011	0.340	0.045	0.033	0.12544
3560.00	2.8090	2.007	0.339	0.044	0.033	0.12491
3580.00	2.7933	2.007	0.338	0.044	0.033	0.12480
3600.00	2.7778	2.006	0.340	0.044	0.033	0.12469
3620.00	2.7624	2.004	0.339	0.044	0.033	0.12435
3640.00	2.7473	2.003	0.339	0.044	0.033	0.12420
3660.00	2.7322	2.003	0.339	0.044	0.033	0.12425
3680.00	2.7174	2.002	0.340	0.044	0.033	0.12425
3700.00	2.7027	2.000	0.340	0.044	0.033	0.12400
3720.00	2.6882	2.000	0.341	0.044	0.033	0.12394
3740.00	2.6738	1.997	0.342	0.044	0.033	0.12365
3760.00	2.6596	1.997	0.341	0.044	0.033	0.12355
3780.00	2.6455	1.995	0.342	0.044	0.033	0.12335
3800.00	2.6316	1.995	0.342	0.044	0.033	0.12339
3820.00	2.6178	1.993	0.343	0.044	0.033	0.12310
3840.00	2.6042	1.992	0.342	0.044	0.033	0.12290
3860.00	2.5907	1.991	0.343	0.044	0.033	0.12286
3880.00	2.5773	1.989	0.343	0.044	0.033	0.12261
3900.00	2.5641	1.988	0.343	0.044	0.033	0.12246
3920.00	2.5510	1.988	0.344	0.044	0.033	0.1222
3940.00	2.5381	1.985	0.345	0.044	0.033	0.12
3960.00	2.5253	1.986	0.343	0.044	0.033	0.12221
3980.00	2.5126	1.985	0.346	0.044	0.033	0.12220
4000.00	2.5000	1.984	0.346	0.044	0.033	0.12210
4032.26	2.4800	1.981	0.347	0.044	0.033	0.12184
4065.04	2.4600	1.979	0.348	0.043	0.034	0.12159
4098.36	2.4400	1.977	0.349	0.043	0.034	0.12129
4132.23	2.4200	1.974	0.350	0.043	0.034	0.12099
4166.67	2.4000	1.971	0.351	0.043	0.034	0.12064
4201.68	2.3800	1.968	0.351	0.043	0.034	0.12029
4237.29	2.3600	1.966	0.352	0.043	0.034	0.11994
4273.50	2.3400	1.963	0.352	0.043	0.034	0.11959

Table 12. NMSU Diesel Soot Pellet.

PAGE 5

WN	WL	N	K	DN	DK	R
4310.34	2.3200	1.960	0.353	0.043	0.034	0.11919
4347.83	2.3000	1.956	0.353	0.043	0.034	0.11874
4385.96	2.2800	1.954	0.353	0.042	0.034	0.11834
4424.78	2.2600	1.951	0.353	0.042	0.034	0.11794
4464.29	2.2400	1.947	0.353	0.042	0.034	0.11749
4504.50	2.2200	1.945	0.353	0.042	0.033	0.11709
4545.45	2.2000	1.942	0.352	0.042	0.033	0.11664
4587.16	2.1800	1.939	0.352	0.042	0.033	0.11624
4629.63	2.1600	1.936	0.352	0.042	0.033	0.11579
4672.90	2.1400	1.933	0.351	0.042	0.033	0.11534
4716.98	2.1200	1.929	0.351	0.041	0.033	0.11484
4761.90	2.1000	1.927	0.350	0.041	0.033	0.11439
4807.69	2.0800	1.924	0.349	0.041	0.033	0.11394
4854.37	2.0600	1.921	0.348	0.041	0.033	0.11354
4901.96	2.0400	1.919	0.347	0.041	0.033	0.11314
4950.50	2.0200	1.916	0.347	0.041	0.033	0.11274
5000.00	2.0000	1.914	0.346	0.041	0.033	0.11234
5050.51	1.9800	1.912	0.345	0.040	0.032	0.11199
5102.04	1.9600	1.909	0.345	0.040	0.032	0.11164
5154.64	1.9400	1.907	0.344	0.040	0.032	0.11129
5208.33	1.9200	1.905	0.344	0.040	0.032	0.11099
5263.16	1.9000	1.903	0.343	0.040	0.032	0.11064
5319.15	1.8800	1.900	0.343	0.040	0.032	0.11029
5376.34	1.8600	1.898	0.343	0.040	0.032	0.10999
5434.78	1.8400	1.896	0.343	0.040	0.032	0.10964
5494.51	1.8200	1.893	0.343	0.040	0.032	0.10929
5555.56	1.8000	1.891	0.343	0.039	0.032	0.10894
5617.98	1.7800	1.888	0.343	0.039	0.032	0.10859
5681.82	1.7600	1.885	0.343	0.039	0.032	0.10819
5747.13	1.7400	1.882	0.343	0.039	0.032	0.10774
5813.95	1.7200	1.879	0.343	0.039	0.032	0.10734
5882.35	1.7000	1.876	0.342	0.039	0.032	0.10689
5952.38	1.6800	1.873	0.342	0.039	0.032	0.10639
6024.10	1.6600	1.870	0.341	0.039	0.032	0.10594
6097.56	1.6400	1.867	0.341	0.038	0.032	0.10554
6172.84	1.6200	1.864	0.341	0.038	0.032	0.10509
6250.00	1.6000	1.861	0.340	0.038	0.031	0.10464
6329.11	1.5800	1.858	0.340	0.038	0.031	0.10419
6410.26	1.5600	1.855	0.340	0.038	0.031	0.10374
6493.51	1.5400	1.852	0.339	0.038	0.031	0.10329
6578.95	1.5200	1.848	0.339	0.038	0.031	0.10279
6666.67	1.5000	1.844	0.338	0.037	0.031	0.10224
6756.76	1.4800	1.841	0.338	0.037	0.031	0.10179
6849.32	1.4600	1.838	0.338	0.037	0.031	0.10129
6944.44	1.4400	1.835	0.337	0.037	0.031	0.10079
7042.25	1.4200	1.831	0.337	0.037	0.031	0.10029
7142.86	1.4000	1.827	0.336	0.037	0.031	0.09974
7246.38	1.3800	1.824	0.336	0.036	0.031	0.09919
7352.94	1.3600	1.820	0.335	0.036	0.031	0.09869
7462.69	1.3400	1.816	0.335	0.036	0.030	0.09809

Table 12. NMSU Diesel Soot Pellet.

PAGE 6

WN	WL	N	K	DN	DK	R
7575.76	1.3200	1.812	0.334	0.036	0.030	0.09749
7692.31	1.3000	1.809	0.333	0.036	0.030	0.09694
7812.50	1.2800	1.805	0.332	0.036	0.030	0.09634
7936.51	1.2600	1.801	0.331	0.035	0.030	0.09579
8064.52	1.2400	1.797	0.331	0.035	0.030	0.09519
8196.72	1.2200	1.793	0.330	0.035	0.030	0.09459
8333.33	1.2000	1.789	0.329	0.035	0.030	0.09389
8474.58	1.1800	1.785	0.328	0.035	0.030	0.09329
8620.69	1.1600	1.780	0.327	0.034	0.029	0.09264
8771.93	1.1400	1.776	0.326	0.034	0.029	0.09199
8928.57	1.1200	1.772	0.325	0.034	0.029	0.09134
9090.91	1.1000	1.768	0.324	0.034	0.029	0.09069
9259.26	1.0800	1.763	0.323	0.034	0.029	0.08999
9433.96	1.0600	1.759	0.321	0.033	0.029	0.08929
9615.38	1.0400	1.755	0.320	0.033	0.029	0.08864
9803.92	1.0200	1.750	0.319	0.033	0.028	0.08794
10000.00	1.0000	1.746	0.318	0.033	0.028	0.08724
10204.08	0.9800	1.741	0.317	0.033	0.028	0.08649
10416.67	0.9600	1.736	0.315	0.032	0.028	0.08574
10638.30	0.9400	1.731	0.314	0.032	0.028	0.08504
10869.57	0.9200	1.727	0.313	0.032	0.028	0.08429
11111.11	0.9000	1.722	0.312	0.032	0.028	0.08359
11363.64	0.8800	1.715	0.311	0.031	0.027	0.08260
11627.91	0.8600	1.710	0.308	0.031	0.027	0.08171
11904.76	0.8400	1.706	0.306	0.031	0.027	0.08105
12195.12	0.8200	1.701	0.305	0.031	0.027	0.08025
12500.00	0.8000	1.694	0.304	0.030	0.027	0.07935
12820.51	0.7800	1.688	0.302	0.030	0.026	0.07835
13157.89	0.7600	1.682	0.300	0.030	0.026	0.07735
13513.51	0.7400	1.676	0.298	0.030	0.026	0.07640
13888.89	0.7200	1.670	0.295	0.029	0.026	0.07545
14285.71	0.7000	1.664	0.293	0.029	0.025	0.07450
14705.88	0.6800	1.658	0.291	0.029	0.025	0.07351
15151.52	0.6600	1.652	0.289	0.028	0.025	0.07255
15625.00	0.6400	1.646	0.287	0.028	0.025	0.07160
16129.03	0.6200	1.639	0.285	0.028	0.025	0.07050
16666.67	0.6000	1.632	0.283	0.027	0.024	0.06945
17241.38	0.5800	1.624	0.281	0.027	0.024	0.06836
17857.14	0.5600	1.617	0.279	0.027	0.024	0.06720
18518.52	0.5400	1.608	0.277	0.026	0.024	0.06595
19230.77	0.5200	1.599	0.275	0.026	0.023	0.06460
20000.00	0.5000	1.589	0.273	0.026	0.023	0.06326
20833.33	0.4800	1.577	0.272	0.025	0.023	0.06159
21739.13	0.4600	1.565	0.266	0.025	0.022	0.05964
22727.27	0.4400	1.553	0.262	0.024	0.022	0.05779
23809.52	0.4200	1.539	0.255	0.023	0.021	0.05555
25000.00	0.4000	1.528	0.249	0.023	0.021	0.05365
26315.79	0.3800	1.514	0.243	0.022	0.020	0.05145
27777.78	0.3600	1.500	0.236	0.021	0.020	0.04930
29411.76	0.3400	1.483	0.230	0.021	0.019	0.04679

Table 12. NMSU Diesel Soot Pellet.

P 3 7

WN	WL	N	K	DN	DK	R
31250.00	0.3200	1.460	0.220	0.020	0.018	0.04334
33333.33	0.3000	1.439	0.205	0.018	0.017	0.03985
35714.29	0.2800	1.415	0.189	0.017	0.015	0.03610
38461.54	0.2600	1.390	0.171	0.016	0.014	0.03214

Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	2.449	0.351	0.071	0.039	0.18690
200.00	50.0000	2.416	0.347	0.066	0.038	0.18212
220.00	45.4545	2.397	0.342	0.065	0.037	0.17936
240.00	41.6667	2.372	0.345	0.063	0.037	0.17606
260.00	38.4615	2.348	0.337	0.062	0.036	0.17241
280.00	35.7143	2.333	0.331	0.061	0.036	0.17000
300.00	33.3333	2.318	0.325	0.060	0.035	0.16766
320.00	31.2500	2.307	0.323	0.059	0.034	0.16600
340.00	29.4118	2.296	0.319	0.058	0.034	0.16424
360.00	27.7778	2.288	0.319	0.058	0.034	0.16311
380.00	26.3158	2.276	0.319	0.057	0.034	0.16144
400.00	25.0000	2.265	0.318	0.057	0.034	0.15984
420.00	23.8095	2.254	0.316	0.056	0.033	0.15820
440.00	22.7273	2.245	0.315	0.056	0.033	0.15688
460.00	21.7391	2.238	0.312	0.055	0.033	0.15576
480.00	20.8333	2.229	0.311	0.055	0.033	0.15441
500.00	20.0000	2.223	0.308	0.054	0.032	0.15349
520.00	19.2308	2.216	0.309	0.054	0.032	0.15251
540.00	18.5185	2.210	0.307	0.054	0.032	0.15161
560.00	17.8571	2.204	0.307	0.053	0.032	0.15080
580.00	17.2414	2.199	0.307	0.053	0.032	0.15011
600.00	16.6667	2.195	0.309	0.053	0.032	0.14954
620.00	16.1290	2.187	0.313	0.052	0.032	0.14865
640.00	15.6250	2.177	0.311	0.052	0.032	0.14716
660.00	15.1515	2.173	0.308	0.052	0.032	0.14641
680.00	14.7059	2.168	0.309	0.051	0.032	0.14580
700.00	14.2857	2.163	0.306	0.051	0.032	0.14486
720.00	13.8889	2.162	0.307	0.051	0.032	0.14484
740.00	13.5135	2.159	0.314	0.051	0.032	0.14474
760.00	13.1579	2.145	0.317	0.050	0.032	0.14295
780.00	12.8205	2.139	0.310	0.050	0.032	0.14175
800.00	12.5000	2.139	0.312	0.050	0.032	0.14175
820.00	12.1951	2.132	0.315	0.050	0.032	0.14094
840.00	11.9048	2.122	0.314	0.049	0.032	0.13959
860.00	11.6279	2.120	0.308	0.049	0.031	0.13885
880.00	11.3636	2.117	0.311	0.049	0.032	0.13869
900.00	11.1111	2.108	0.308	0.048	0.031	0.13720
920.00	10.8696	2.105	0.303	0.048	0.031	0.13654
940.00	10.6383	2.109	0.299	0.048	0.030	0.13682
960.00	10.4167	2.110	0.303	0.048	0.031	0.13730
980.00	10.2041	2.109	0.306	0.048	0.031	0.13722
1000.00	10.0000	2.108	0.310	0.048	0.031	0.13739
1020.00	9.8039	2.106	0.314	0.048	0.032	0.13725
1040.00	9.6154	2.102	0.319	0.048	0.032	0.13695
1060.00	9.4340	2.097	0.322	0.048	0.032	0.13640
1080.00	9.2593	2.093	0.325	0.048	0.033	0.13611
1100.00	9.0909	2.087	0.330	0.048	0.033	0.13558
1120.00	8.9286	2.083	0.333	0.048	0.033	0.13519
1140.00	8.7719	2.075	0.340	0.048	0.034	0.13449
1160.00	8.6207	2.066	0.339	0.047	0.034	0.13310

Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
1180.00	8.4746	2.060	0.341	0.047	0.034	0.13244
1200.00	8.3333	2.052	0.344	0.047	0.034	0.13154
1220.00	8.1967	2.042	0.345	0.046	0.034	0.13011
1240.00	8.0645	2.034	0.344	0.046	0.034	0.12885
1260.00	7.9365	2.025	0.343	0.045	0.034	0.12755
1280.00	7.8125	2.017	0.339	0.045	0.033	0.12620
1300.00	7.6923	2.009	0.334	0.044	0.033	0.12485
1320.00	7.5758	2.005	0.330	0.044	0.032	0.12395
1340.00	7.4627	2.000	0.327	0.044	0.032	0.12311
1360.00	7.3529	1.996	0.323	0.043	0.032	0.12226
1380.00	7.2464	1.991	0.319	0.043	0.031	0.12140
1400.00	7.1429	1.990	0.314	0.043	0.031	0.12091
1420.00	7.0423	1.989	0.313	0.043	0.031	0.12070
1440.00	6.9444	1.986	0.313	0.043	0.030	0.12027
1460.00	6.8493	1.983	0.309	0.042	0.030	0.11951
1480.00	6.7568	1.982	0.305	0.042	0.030	0.11916
1500.00	6.6667	1.983	0.305	0.042	0.030	0.11929
1520.00	6.5789	1.980	0.306	0.042	0.030	0.11900
1540.00	6.4935	1.979	0.307	0.042	0.030	0.11879
1560.00	6.4103	1.977	0.308	0.042	0.030	0.11870
1580.00	6.3291	1.971	0.315	0.042	0.030	0.11818
1600.00	6.2500	1.956	0.314	0.041	0.030	0.11600
1620.00	6.1728	1.947	0.303	0.041	0.029	0.11415
1640.00	6.0976	1.944	0.294	0.040	0.028	0.11319
1660.00	6.0241	1.944	0.285	0.040	0.028	0.11264
1680.00	5.9524	1.950	0.278	0.040	0.027	0.11301
1700.00	5.8824	1.955	0.277	0.040	0.027	0.11370
1720.00	5.8140	1.956	0.280	0.040	0.027	0.11402
1740.00	5.7471	1.953	0.281	0.040	0.027	0.11361
1760.00	5.6818	1.950	0.278	0.040	0.027	0.11306
1780.00	5.6180	1.949	0.275	0.040	0.027	0.11274
1800.00	5.5556	1.951	0.271	0.040	0.026	0.11278
1820.00	5.4945	1.953	0.270	0.040	0.026	0.11306
1840.00	5.4348	1.956	0.270	0.040	0.026	0.11344
1860.00	5.3763	1.955	0.271	0.040	0.026	0.11340
1880.00	5.3191	1.955	0.273	0.040	0.027	0.11351
1900.00	5.2632	1.954	0.273	0.040	0.027	0.11326
1920.00	5.2083	1.955	0.274	0.040	0.027	0.11355
1940.00	5.1546	1.954	0.275	0.040	0.027	0.11345
1960.00	5.1020	1.954	0.276	0.040	0.027	0.11350
1980.00	5.0505	1.952	0.279	0.040	0.027	0.11340
2000.00	5.0000	1.946	0.279	0.040	0.027	0.11257
2020.00	4.9505	1.944	0.275	0.040	0.027	0.11206
2040.00	4.9020	1.946	0.273	0.040	0.026	0.11214
2060.00	4.8544	1.946	0.274	0.040	0.027	0.11226
2080.00	4.8077	1.945	0.275	0.040	0.027	0.11218
2100.00	4.7619	1.944	0.274	0.039	0.027	0.11190
2120.00	4.7170	1.945	0.275	0.040	0.027	0.11223
2140.00	4.6729	1.943	0.276	0.040	0.027	0.11193
2160.00	4.6296	1.942	0.277	0.039	0.027	0.11180

Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.941	0.277	0.039	0.027	0.11167
2200.00	4.5455	1.940	0.278	0.039	0.027	0.11159
2220.00	4.5045	1.937	0.278	0.039	0.027	0.11124
2240.00	4.4643	1.938	0.278	0.039	0.027	0.11135
2260.00	4.4248	1.938	0.278	0.039	0.027	0.11130
2280.00	4.3860	1.936	0.280	0.039	0.027	0.11111
2300.00	4.3478	1.933	0.280	0.039	0.027	0.11075
2320.00	4.3103	1.929	0.279	0.039	0.027	0.11013
2340.00	4.2735	1.929	0.276	0.039	0.027	0.10999
2360.00	4.2373	1.929	0.275	0.039	0.027	0.10994
2380.00	4.2017	1.932	0.276	0.039	0.027	0.11036
2400.00	4.1667	1.932	0.279	0.039	0.027	0.11054
2420.00	4.1322	1.930	0.280	0.039	0.027	0.11029
2440.00	4.0984	1.929	0.281	0.039	0.027	0.11015
2460.00	4.0650	1.927	0.282	0.039	0.027	0.11010
2480.00	4.0323	1.924	0.284	0.039	0.027	0.10971
2500.00	4.0000	1.923	0.282	0.039	0.027	0.10940
2520.00	3.9683	1.922	0.281	0.039	0.027	0.10926
2540.00	3.9370	1.922	0.283	0.039	0.027	0.10939
2560.00	3.9063	1.920	0.285	0.039	0.027	0.10910
2580.00	3.8760	1.918	0.284	0.039	0.027	0.10893
2600.00	3.8462	1.918	0.284	0.039	0.027	0.10882
2620.00	3.8168	1.917	0.285	0.039	0.027	0.10875
2640.00	3.7879	1.913	0.286	0.038	0.027	0.10825
2660.00	3.7594	1.913	0.282	0.038	0.027	0.10806
2680.00	3.7313	1.915	0.285	0.039	0.027	0.10846
2700.00	3.7037	1.912	0.286	0.038	0.027	0.10811
2720.00	3.6765	1.911	0.287	0.038	0.027	0.10796
2740.00	3.6496	1.909	0.287	0.038	0.027	0.10780
2760.00	3.6232	1.909	0.286	0.038	0.027	0.10767
2780.00	3.5971	1.908	0.287	0.038	0.027	0.10756
2800.00	3.5714	1.908	0.288	0.038	0.027	0.10760
2820.00	3.5461	1.905	0.289	0.038	0.028	0.10736
2840.00	3.5211	1.904	0.289	0.038	0.028	0.10712
2860.00	3.4965	1.903	0.290	0.038	0.028	0.10708
2880.00	3.4722	1.900	0.290	0.038	0.028	0.10669
2900.00	3.4483	1.900	0.289	0.038	0.028	0.10660
2920.00	3.4247	1.898	0.289	0.038	0.028	0.10639
2940.00	3.4014	1.899	0.290	0.038	0.028	0.10646
2960.00	3.3784	1.896	0.291	0.038	0.028	0.10609
2980.00	3.3557	1.896	0.289	0.038	0.028	0.10605
3000.00	3.3333	1.896	0.291	0.038	0.028	0.10610
3020.00	3.3113	1.895	0.293	0.038	0.028	0.10610
3040.00	3.2895	1.892	0.295	0.038	0.028	0.10590
3060.00	3.2680	1.891	0.293	0.038	0.028	0.10561
3080.00	3.2468	1.890	0.296	0.038	0.028	0.10566
3100.00	3.2258	1.886	0.295	0.038	0.028	0.10505
3120.00	3.2051	1.885	0.294	0.038	0.028	0.10480
3140.00	3.1847	1.884	0.293	0.037	0.028	0.10466
3160.00	3.1646	1.885	0.293	0.037	0.028	0.10470

Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 4

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.884	0.295	0.038	0.028	0.10476
3200.00	3.1250	1.881	0.296	0.037	0.028	0.10435
3220.00	3.1056	1.881	0.294	0.037	0.028	0.10425
3240.00	3.0864	1.880	0.297	0.037	0.028	0.10422
3260.00	3.0675	1.877	0.295	0.037	0.028	0.10366
3280.00	3.0488	1.878	0.293	0.037	0.028	0.10379
3300.00	3.0303	1.877	0.295	0.037	0.028	0.10380
3320.00	3.0120	1.876	0.296	0.037	0.028	0.10370
3340.00	2.9940	1.875	0.296	0.037	0.028	0.10356
3360.00	2.9762	1.875	0.297	0.037	0.028	0.10359
3380.00	2.9586	1.874	0.298	0.037	0.028	0.10350
3400.00	2.9412	1.872	0.299	0.037	0.028	0.10329
3420.00	2.9240	1.871	0.297	0.037	0.028	0.10298
3440.00	2.9070	1.870	0.300	0.037	0.028	0.10311
3460.00	2.8902	1.867	0.298	0.037	0.028	0.10254
3480.00	2.8736	1.869	0.300	0.037	0.028	0.10288
3500.00	2.8571	1.865	0.301	0.037	0.028	0.10250
3520.00	2.8409	1.864	0.300	0.037	0.028	0.10225
3540.00	2.8249	1.864	0.300	0.037	0.028	0.10227
3560.00	2.8090	1.863	0.301	0.037	0.028	0.10216
3580.00	2.7933	1.862	0.302	0.037	0.028	0.10210
3600.00	2.7778	1.860	0.303	0.037	0.028	0.10189
3620.00	2.7624	1.858	0.303	0.037	0.028	0.10160
3640.00	2.7473	1.858	0.302	0.037	0.028	0.10155
3660.00	2.7322	1.857	0.303	0.037	0.028	0.10136
3680.00	2.7174	1.857	0.303	0.037	0.028	0.10137
3700.00	2.7027	1.854	0.304	0.037	0.028	0.10110
3720.00	2.6882	1.855	0.302	0.037	0.028	0.10110
3740.00	2.6738	1.853	0.306	0.037	0.028	0.10105
3760.00	2.6596	1.852	0.303	0.036	0.028	0.10074
3780.00	2.6455	1.852	0.305	0.037	0.028	0.10091
3800.00	2.6316	1.849	0.305	0.036	0.028	0.10055
3820.00	2.6178	1.849	0.304	0.036	0.028	0.10036
3840.00	2.6042	1.849	0.305	0.036	0.028	0.10045
3860.00	2.5907	1.847	0.306	0.036	0.028	0.10024
3880.00	2.5773	1.846	0.307	0.036	0.029	0.10021
3900.00	2.5641	1.845	0.307	0.036	0.029	0.10004
3920.00	2.5510	1.845	0.308	0.036	0.029	0.10008
3940.00	2.5381	1.843	0.309	0.036	0.029	0.09996
3960.00	2.5253	1.842	0.309	0.036	0.029	0.09971
3980.00	2.5126	1.841	0.309	0.036	0.029	0.09966
4000.00	2.5000	1.842	0.311	0.036	0.029	0.09984
4032.26	2.4800	1.839	0.312	0.036	0.029	0.09954
4065.04	2.4600	1.836	0.314	0.036	0.029	0.09929
4098.36	2.4400	1.833	0.315	0.036	0.029	0.09899
4132.23	2.4200	1.830	0.316	0.036	0.029	0.09864
4166.67	2.4000	1.827	0.317	0.036	0.029	0.09829
4201.68	2.3800	1.825	0.317	0.036	0.029	0.09794
4237.29	2.3600	1.822	0.318	0.036	0.029	0.09759
4273.50	2.3400	1.819	0.318	0.036	0.029	0.09719



Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 5

WN	WL	N	K	DN	DK	R
4310.34	2.3200	1.815	0.319	0.036	0.029	0.09679
4347.83	2.3000	1.812	0.318	0.035	0.029	0.09634
4385.96	2.2800	1.809	0.319	0.035	0.029	0.09594
4424.78	2.2600	1.806	0.318	0.035	0.029	0.09549
4464.29	2.2400	1.803	0.318	0.035	0.029	0.09504
4504.50	2.2200	1.800	0.318	0.035	0.029	0.09464
4545.45	2.2000	1.797	0.317	0.035	0.029	0.09419
4587.16	2.1800	1.794	0.317	0.035	0.029	0.09374
4629.63	2.1600	1.791	0.316	0.034	0.029	0.09324
4672.90	2.1400	1.788	0.315	0.034	0.029	0.09279
4716.98	2.1200	1.785	0.314	0.034	0.028	0.09234
4761.90	2.1000	1.783	0.314	0.034	0.028	0.09194
4807.69	2.0800	1.780	0.313	0.034	0.028	0.09149
4854.37	2.0600	1.778	0.312	0.034	0.028	0.09109
4901.96	2.0400	1.775	0.311	0.034	0.028	0.09069
4950.50	2.0200	1.773	0.309	0.034	0.028	0.09024
5000.00	2.0000	1.771	0.308	0.033	0.028	0.08994
5050.51	1.9800	1.769	0.307	0.033	0.028	0.08959
5102.04	1.9600	1.767	0.307	0.033	0.028	0.08929
5154.64	1.9400	1.765	0.306	0.033	0.028	0.08899
5208.33	1.9200	1.763	0.306	0.033	0.028	0.08869
5263.16	1.9000	1.761	0.305	0.033	0.027	0.08839
5319.15	1.8800	1.759	0.305	0.033	0.027	0.08809
5376.34	1.8600	1.757	0.304	0.033	0.027	0.08779
5434.78	1.8400	1.755	0.304	0.033	0.027	0.08754
5494.51	1.8200	1.753	0.304	0.033	0.027	0.08714
5555.56	1.8000	1.751	0.304	0.032	0.027	0.08684
5617.98	1.7800	1.748	0.303	0.032	0.027	0.08649
5681.82	1.7600	1.746	0.303	0.032	0.027	0.08614
5747.13	1.7400	1.743	0.303	0.032	0.027	0.08579
5813.95	1.7200	1.741	0.302	0.032	0.027	0.08544
5882.35	1.7000	1.739	0.302	0.032	0.027	0.08509
5952.38	1.6800	1.736	0.302	0.032	0.027	0.08474
6024.10	1.6600	1.734	0.302	0.032	0.027	0.08439
6097.56	1.6400	1.731	0.301	0.032	0.027	0.08394
6172.84	1.6200	1.728	0.301	0.032	0.027	0.08359
6250.00	1.6000	1.725	0.300	0.031	0.027	0.08319
6329.11	1.5800	1.723	0.300	0.031	0.027	0.08284
6410.26	1.5600	1.720	0.299	0.031	0.027	0.08244
6493.51	1.5400	1.718	0.299	0.031	0.027	0.08209
6578.95	1.5200	1.715	0.299	0.031	0.026	0.08169
6666.67	1.5000	1.712	0.299	0.031	0.026	0.08129
6756.76	1.4800	1.709	0.298	0.031	0.026	0.08084
6849.32	1.4600	1.706	0.298	0.031	0.026	0.08044
6944.44	1.4400	1.703	0.297	0.031	0.026	0.07999
7042.25	1.4200	1.700	0.297	0.030	0.026	0.07959
7142.86	1.4000	1.697	0.297	0.030	0.026	0.07914
7246.38	1.3800	1.694	0.296	0.030	0.026	0.07869
7352.94	1.3600	1.691	0.296	0.030	0.026	0.07824
7462.69	1.3400	1.688	0.295	0.030	0.026	0.07774

Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 6

WN	WL	N	K	DN	DK	R
7575.76	1.3200	1.685	0.295	0.030	0.026	0.07729
7692.31	1.3000	1.681	0.294	0.030	0.026	0.07679
7812.50	1.2800	1.678	0.293	0.029	0.026	0.07629
7936.51	1.2600	1.674	0.293	0.029	0.026	0.07579
8064.52	1.2400	1.671	0.292	0.029	0.025	0.07529
8196.72	1.2200	1.668	0.292	0.029	0.025	0.07483
8333.33	1.2000	1.664	0.290	0.029	0.025	0.07424
8474.58	1.1800	1.661	0.290	0.029	0.025	0.07374
8620.69	1.1600	1.657	0.289	0.029	0.025	0.07324
8771.93	1.1400	1.654	0.288	0.028	0.025	0.07274
8928.57	1.1200	1.650	0.288	0.028	0.025	0.07219
9090.91	1.1000	1.646	0.287	0.028	0.025	0.07159
9259.26	1.0800	1.642	0.286	0.028	0.025	0.07104
9433.96	1.0600	1.638	0.285	0.028	0.025	0.07049
9615.38	1.0400	1.635	0.284	0.028	0.024	0.06994
9803.92	1.0200	1.631	0.284	0.027	0.024	0.06934
10000.00	1.0000	1.626	0.283	0.027	0.024	0.06874
10204.08	0.9800	1.622	0.282	0.027	0.024	0.06809
10416.67	0.9600	1.618	0.280	0.027	0.024	0.06744
10638.30	0.9400	1.614	0.279	0.027	0.024	0.06684
10869.57	0.9200	1.609	0.278	0.027	0.024	0.06619
11111.11	0.9000	1.605	0.277	0.026	0.024	0.06559
11363.64	0.8800	1.600	0.276	0.026	0.023	0.06484
11627.91	0.8600	1.596	0.275	0.026	0.023	0.06419
11904.76	0.8400	1.592	0.274	0.026	0.023	0.06354
12195.12	0.8200	1.587	0.272	0.026	0.023	0.06290
12500.00	0.8000	1.583	0.273	0.025	0.023	0.06233
12820.51	0.7800	1.576	0.273	0.025	0.023	0.06150
13157.89	0.7600	1.570	0.271	0.025	0.023	0.06060
13513.51	0.7400	1.563	0.269	0.025	0.023	0.05955
13888.89	0.7200	1.557	0.267	0.024	0.022	0.05865
14285.71	0.7000	1.552	0.264	0.024	0.022	0.05780
14705.88	0.6800	1.545	0.262	0.024	0.022	0.05681
15151.52	0.6600	1.539	0.260	0.024	0.022	0.05585
15625.00	0.6400	1.533	0.256	0.023	0.021	0.05489
16129.03	0.6200	1.528	0.254	0.023	0.021	0.05415
16666.67	0.6000	1.522	0.253	0.023	0.021	0.05321
17241.38	0.5800	1.516	0.250	0.022	0.021	0.05221
17857.14	0.5600	1.510	0.249	0.022	0.020	0.05140
18518.52	0.5400	1.502	0.248	0.022	0.020	0.05044
19230.77	0.5200	1.494	0.245	0.022	0.020	0.04923
20000.00	0.5000	1.485	0.243	0.021	0.020	0.04805
20833.33	0.4800	1.476	0.242	0.021	0.020	0.04686
21739.13	0.4600	1.466	0.239	0.021	0.019	0.04536
22727.27	0.4400	1.455	0.235	0.020	0.019	0.04389
23809.52	0.4200	1.444	0.232	0.020	0.019	0.04231
25000.00	0.4000	1.431	0.228	0.019	0.018	0.04061
26315.79	0.3800	1.417	0.223	0.019	0.018	0.03861
27777.78	0.3600	1.400	0.216	0.018	0.017	0.03625
29411.76	0.3400	1.384	0.206	0.017	0.016	0.03379

Table 13. NMSU Heated Diesel Soot Pellet.

PAGE 7

WN	WL	N	K	DN	DK	R
31250.00	0.3200	1.367	0.196	0.016	0.015	0.03124
33333.33	0.3000	1.350	0.184	0.015	0.014	0.02870
35714.29	0.2800	1.329	0.171	0.014	0.013	0.02570
38461.54	0.2600	1.306	0.155	0.013	0.012	0.02245

Table 14. UMKC Diesel Soot Pellet.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	2.655	0.276	0.083	0.032	0.21150
200.00	50.0000	2.611	0.297	0.077	0.034	0.20645
220.00	45.4545	2.576	0.304	0.075	0.035	0.20199
240.00	41.6667	2.556	0.300	0.073	0.034	0.19916
260.00	38.4615	2.541	0.305	0.073	0.035	0.19731
280.00	35.7143	2.526	0.309	0.072	0.035	0.19549
300.00	33.3333	2.511	0.312	0.071	0.035	0.19354
320.00	31.2500	2.496	0.320	0.070	0.036	0.19179
340.00	29.4118	2.476	0.323	0.069	0.036	0.18920
360.00	27.7778	2.460	0.320	0.068	0.036	0.18689
380.00	26.3158	2.451	0.320	0.067	0.035	0.18571
400.00	25.0000	2.439	0.325	0.067	0.036	0.18430
420.00	23.8095	2.425	0.325	0.066	0.036	0.18236
440.00	22.7273	2.413	0.325	0.065	0.036	0.18075
460.00	21.7391	2.404	0.324	0.065	0.035	0.17949
480.00	20.8333	2.395	0.326	0.064	0.036	0.17824
500.00	20.0000	2.384	0.325	0.064	0.035	0.17675
520.00	19.2308	2.377	0.326	0.063	0.035	0.17583
540.00	18.5185	2.366	0.325	0.063	0.035	0.17430
560.00	17.8571	2.359	0.323	0.062	0.035	0.17326
580.00	17.2414	2.351	0.322	0.062	0.035	0.17209
600.00	16.6667	2.348	0.321	0.061	0.035	0.17156
620.00	16.1290	2.340	0.322	0.061	0.035	0.17049
640.00	15.6250	2.338	0.319	0.061	0.034	0.17009
660.00	15.1515	2.336	0.323	0.061	0.035	0.17004
680.00	14.7059	2.331	0.328	0.061	0.035	0.16958
700.00	14.2857	2.323	0.329	0.060	0.035	0.16855
720.00	13.8889	2.322	0.330	0.060	0.035	0.16839
740.00	13.5135	2.319	0.345	0.060	0.037	0.16875
760.00	13.1579	2.294	0.349	0.059	0.037	0.16544
780.00	12.8205	2.286	0.334	0.058	0.035	0.16360
800.00	12.5000	2.290	0.335	0.059	0.036	0.16426
820.00	12.1951	2.283	0.343	0.058	0.036	0.16370
840.00	11.9048	2.269	0.342	0.058	0.036	0.16160
860.00	11.6279	2.267	0.333	0.057	0.035	0.16091
880.00	11.3636	2.264	0.340	0.057	0.036	0.16090
900.00	11.1111	2.251	0.338	0.056	0.035	0.15898
920.00	10.8696	2.250	0.328	0.056	0.034	0.15830
940.00	10.6383	2.254	0.328	0.056	0.034	0.15886
960.00	10.4167	2.255	0.332	0.057	0.035	0.15920
980.00	10.2041	2.251	0.336	0.056	0.035	0.15890
1000.00	10.0000	2.249	0.340	0.056	0.036	0.15883
1020.00	9.8039	2.245	0.343	0.056	0.036	0.15840
1040.00	9.6154	2.241	0.348	0.056	0.036	0.15810
1060.00	9.4340	2.235	0.350	0.056	0.036	0.15735
1080.00	9.2593	2.233	0.354	0.056	0.037	0.15729
1100.00	9.0909	2.227	0.360	0.056	0.037	0.15680
1120.00	8.9286	2.221	0.364	0.056	0.038	0.15621
1140.00	8.7719	2.213	0.370	0.055	0.038	0.15554
1160.00	8.6207	2.203	0.374	0.055	0.038	0.15431

Table 14. UMKC Diesel Soot Pellet.

PAGE 2

WN	WL	N	K	DN	DK	R
1180.00	8.4746	2.191	0.375	0.054	0.038	0.15285
1200.00	8.3333	2.183	0.373	0.054	0.038	0.15156
1220.00	8.1967	2.175	0.373	0.054	0.038	0.15049
1240.00	8.0645	2.168	0.373	0.053	0.038	0.14944
1260.00	7.9365	2.157	0.374	0.053	0.038	0.14801
1280.00	7.8125	2.147	0.369	0.052	0.037	0.14635
1300.00	7.6923	2.140	0.365	0.052	0.037	0.14514
1320.00	7.5758	2.134	0.360	0.051	0.036	0.14398
1340.00	7.4627	2.130	0.356	0.051	0.036	0.14304
1360.00	7.3529	2.126	0.353	0.050	0.036	0.14231
1380.00	7.2464	2.121	0.349	0.050	0.035	0.14145
1400.00	7.1429	2.119	0.345	0.050	0.035	0.14094
1420.00	7.0423	2.116	0.343	0.050	0.035	0.14031
1440.00	6.9444	2.112	0.340	0.049	0.034	0.13966
1460.00	6.8493	2.109	0.336	0.049	0.034	0.13895
1480.00	6.7568	2.108	0.334	0.049	0.034	0.13875
1500.00	6.6667	2.107	0.332	0.049	0.033	0.13849
1520.00	6.5789	2.106	0.333	0.049	0.033	0.13839
1540.00	6.4935	2.104	0.334	0.049	0.034	0.13814
1560.00	6.4103	2.100	0.336	0.049	0.034	0.13778
1580.00	6.3291	2.092	0.340	0.048	0.034	0.13690
1600.00	6.2500	2.079	0.336	0.048	0.033	0.13474
1620.00	6.1728	2.073	0.325	0.047	0.032	0.13331
1640.00	6.0976	2.071	0.316	0.047	0.032	0.13246
1660.00	6.0241	2.074	0.308	0.047	0.031	0.13239
1680.00	5.9524	2.078	0.306	0.047	0.031	0.13281
1700.00	5.8824	2.077	0.305	0.047	0.031	0.13259
1720.00	5.8140	2.077	0.301	0.047	0.030	0.13246
1740.00	5.7471	2.079	0.300	0.047	0.030	0.13266
1760.00	5.6818	2.081	0.298	0.047	0.030	0.13276
1780.00	5.6180	2.082	0.299	0.047	0.030	0.13305
1800.00	5.5556	2.083	0.298	0.047	0.030	0.13304
1820.00	5.4945	2.084	0.299	0.047	0.030	0.13330
1840.00	5.4348	2.084	0.300	0.047	0.030	0.13340
1860.00	5.3763	2.083	0.301	0.047	0.030	0.13330
1880.00	5.3191	2.082	0.301	0.047	0.030	0.13321
1900.00	5.2632	2.082	0.304	0.047	0.031	0.13331
1920.00	5.2083	2.080	0.305	0.047	0.031	0.13305
1940.00	5.1546	2.080	0.306	0.047	0.031	0.13310
1960.00	5.1020	2.078	0.308	0.047	0.031	0.13300
1980.00	5.0505	2.077	0.312	0.047	0.031	0.13299
2000.00	5.0000	2.068	0.312	0.046	0.031	0.13170
2020.00	4.9505	2.064	0.306	0.046	0.031	0.13090
2040.00	4.9020	2.065	0.303	0.046	0.030	0.13090
2060.00	4.8544	2.065	0.304	0.046	0.030	0.13089
2080.00	4.8077	2.065	0.304	0.046	0.030	0.13094
2100.00	4.7619	2.064	0.306	0.046	0.031	0.13090
2120.00	4.7170	2.062	0.305	0.046	0.030	0.13050
2140.00	4.6729	2.060	0.303	0.046	0.030	0.13010
2160.00	4.6296	2.060	0.304	0.046	0.030	0.13019

Table 14. UMKC Diesel Soot Pellet.

PAGE 3

WN	WL	N	K	DN	DK	R
2180.00	4.5872	2.058	0.304	0.046	0.030	0.12995
2200.00	4.5455	2.059	0.304	0.046	0.030	0.13000
2220.00	4.5045	2.056	0.305	0.046	0.030	0.12970
2240.00	4.4643	2.055	0.303	0.046	0.030	0.12949
2260.00	4.4248	2.055	0.304	0.046	0.030	0.12951
2280.00	4.3860	2.053	0.303	0.045	0.030	0.12916
2300.00	4.3478	2.056	0.300	0.046	0.030	0.12936
2320.00	4.3103	2.058	0.306	0.046	0.030	0.13004
2340.00	4.2735	2.055	0.308	0.046	0.031	0.12971
2360.00	4.2373	2.056	0.313	0.046	0.031	0.13011
2380.00	4.2017	2.047	0.316	0.046	0.031	0.12904
2400.00	4.1667	2.042	0.312	0.045	0.031	0.12819
2420.00	4.1322	2.042	0.310	0.045	0.031	0.12795
2440.00	4.0984	2.042	0.308	0.045	0.031	0.12791
2460.00	4.0650	2.042	0.310	0.045	0.031	0.12801
2480.00	4.0323	2.040	0.311	0.045	0.031	0.12769
2500.00	4.0000	2.038	0.310	0.045	0.031	0.12743
2520.00	3.9683	2.038	0.312	0.045	0.031	0.12755
2540.00	3.9370	2.035	0.314	0.045	0.031	0.12724
2560.00	3.9063	2.032	0.311	0.045	0.031	0.12664
2580.00	3.8760	2.033	0.311	0.045	0.031	0.12669
2600.00	3.8462	2.031	0.310	0.045	0.031	0.12644
2620.00	3.8168	2.030	0.311	0.045	0.031	0.12635
2640.00	3.7879	2.029	0.312	0.045	0.031	0.12630
2660.00	3.7594	2.028	0.313	0.045	0.031	0.12610
2680.00	3.7313	2.025	0.313	0.044	0.031	0.12581
2700.00	3.7037	2.023	0.310	0.044	0.031	0.12535
2720.00	3.6765	2.026	0.311	0.044	0.031	0.12570
2740.00	3.6496	2.025	0.314	0.044	0.031	0.12572
2760.00	3.6232	2.020	0.314	0.044	0.031	0.12507
2780.00	3.5971	2.020	0.312	0.044	0.031	0.12496
2800.00	3.5714	2.020	0.313	0.044	0.031	0.12503
2820.00	3.5461	2.017	0.313	0.044	0.031	0.12455
2840.00	3.5211	2.017	0.313	0.044	0.031	0.12460
2860.00	3.4965	2.016	0.314	0.044	0.031	0.12454
2880.00	3.4722	2.014	0.314	0.044	0.031	0.12431
2900.00	3.4483	2.016	0.315	0.044	0.031	0.12456
2920.00	3.4247	2.012	0.316	0.044	0.031	0.12404
2940.00	3.4014	2.011	0.315	0.044	0.031	0.12383
2960.00	3.3784	2.009	0.316	0.044	0.031	0.12370
2980.00	3.3557	2.008	0.315	0.044	0.031	0.12341
3000.00	3.3333	2.009	0.315	0.044	0.031	0.12364
3020.00	3.3113	2.008	0.318	0.044	0.031	0.12365
3040.00	3.2895	2.004	0.320	0.044	0.031	0.12324
3060.00	3.2680	2.003	0.318	0.044	0.031	0.12295
3080.00	3.2468	2.001	0.319	0.043	0.031	0.12276
3100.00	3.2258	1.999	0.318	0.043	0.031	0.12238
3120.00	3.2051	2.000	0.318	0.043	0.031	0.12250
3140.00	3.1847	1.998	0.319	0.043	0.031	0.12224
3160.00	3.1646	1.998	0.319	0.043	0.031	0.12231

Table 14. UMKC Diesel Soot Peilet.

PAGE 4

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.995	0.319	0.043	0.031	0.12195
3200.00	3.1250	1.995	0.319	0.043	0.031	0.12183
3220.00	3.1056	1.993	0.318	0.043	0.031	0.12150
3240.00	3.0864	1.994	0.320	0.043	0.031	0.12180
3260.00	3.0675	1.990	0.321	0.043	0.031	0.12128
3280.00	3.0488	1.991	0.319	0.043	0.031	0.12140
3300.00	3.0303	1.990	0.322	0.043	0.031	0.12130
3320.00	3.0120	1.988	0.321	0.043	0.031	0.12105
3340.00	2.9940	1.988	0.321	0.043	0.031	0.12095
3360.00	2.9762	1.987	0.322	0.043	0.031	0.12095
3380.00	2.9586	1.985	0.322	0.043	0.031	0.12070
3400.00	2.9412	1.983	0.322	0.043	0.031	0.12045
3420.00	2.9240	1.983	0.323	0.043	0.031	0.12045
3440.00	2.9070	1.981	0.324	0.043	0.031	0.12024
3460.00	2.8902	1.981	0.324	0.043	0.031	0.12015
3480.00	2.8736	1.980	0.325	0.043	0.031	0.12010
3500.00	2.8571	1.978	0.325	0.043	0.031	0.11988
3520.00	2.8409	1.976	0.326	0.043	0.032	0.11966
3540.00	2.8249	1.975	0.325	0.042	0.031	0.11939
3560.00	2.8090	1.975	0.324	0.042	0.031	0.11934
3580.00	2.7933	1.975	0.325	0.042	0.031	0.11945
3600.00	2.7778	1.974	0.327	0.042	0.032	0.11939
3620.00	2.7624	1.972	0.328	0.042	0.032	0.11919
3640.00	2.7473	1.970	0.327	0.042	0.032	0.11894
3660.00	2.7322	1.970	0.328	0.042	0.032	0.11890
3680.00	2.7174	1.969	0.329	0.042	0.032	0.11885
3700.00	2.7027	1.968	0.329	0.042	0.032	0.11876
3720.00	2.6882	1.968	0.330	0.042	0.032	0.11879
3740.00	2.6738	1.966	0.331	0.042	0.032	0.11855
3760.00	2.6596	1.965	0.332	0.042	0.032	0.11848
3780.00	2.6455	1.962	0.333	0.042	0.032	0.11819
3800.00	2.6316	1.961	0.333	0.042	0.032	0.11795
3820.00	2.6178	1.958	0.333	0.042	0.032	0.11761
3840.00	2.6042	1.959	0.332	0.042	0.032	0.11770
3860.00	2.5907	1.958	0.335	0.042	0.032	0.11775
3880.00	2.5773	1.957	0.334	0.042	0.032	0.11758
3900.00	2.5641	1.957	0.337	0.042	0.032	0.11766
3920.00	2.5510	1.954	0.338	0.042	0.032	0.11730
3940.00	2.5381	1.953	0.335	0.042	0.032	0.11700
3960.00	2.5253	1.954	0.339	0.042	0.032	0.11739
3980.00	2.5126	1.950	0.339	0.042	0.032	0.11687
4000.00	2.5000	1.949	0.340	0.042	0.032	0.11686

#### 4.13 Lanthanum Hexaboride ( $\text{LaB}_6$ )

After numerous attempts we acquired only one pellet of lanthanum hexaboride from the powdered sample. The surface of the pellet was quite rough (not specular). We therefore acquired a specular reflectance spectrum of the rough surface in the infrared region only. We did not attempt to determine the optical constants from that spectrum. The reflectance spectrum is presented in Figure 28.



LANTHANUM HEXABORIDE (ROUGH SURFACE) PELLET

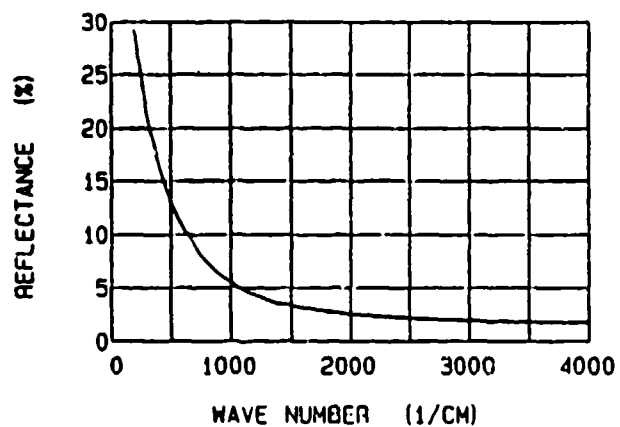


Figure 28. The infrared ( $180-4,000\text{ cm}^{-1}$ ) reflectance spectrum of a lanthanum hexaboride pellet .

#### 4.14 Anhydrite (Calcium Sulfate)

Anhydrite is an optically biaxial orthorhombic crystal with optical directions  $x, y, z$  coinciding with crystalline axes  $c, b, a$ ; respectively. For Na light the refractive indices<sup>12</sup> are  $n_x=1.5700$ ,  $n_y=1.5757$ , and  $n_z=1.6138$ . A natural crystalline sample was obtained from Ward's Natural Science Establishment, Rochester, NY. The sample, about  $1 \times 1 \times 2 \text{ cm}^3$ , was cleaved in preparation for acquisition of reflectance spectra for the  $x, y, z$  directions. The near-normal incidence infrared reflectance spectra are presented in Figures 29-31 along with the spectral values of  $n$  and  $k$ . These quantities are also presented in Tables 15-17.

Several nir-vis-uv reflectance spectra, acquired for each of the three orientations of the crystal, gave ambiguous results. Those spectra have to be measured again and at a later date combined with the infrared spectra. The ambiguity in the spectra was due to considerable maintenance problems with the Varian model 2300 spectrometer during the latter months of this contract.

ANHYDRITE: X-DIRECTION

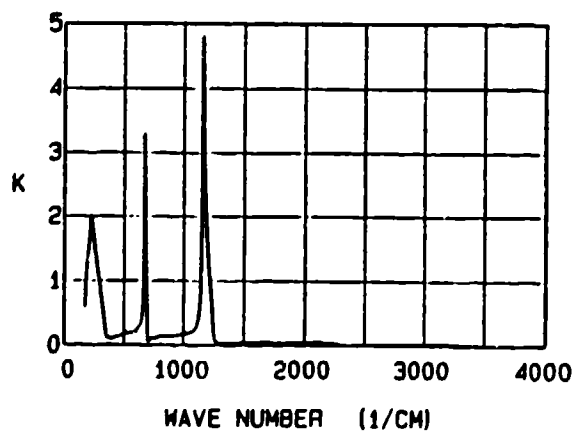
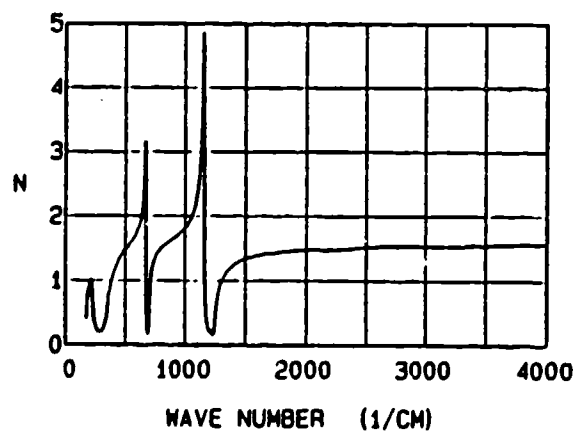
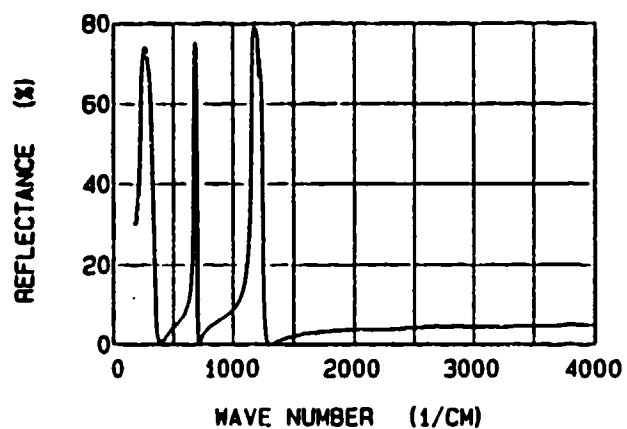


Figure 29. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of anhydrite, E//X.

Table 15. Anhydrite E Parallel to X-axis.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	0.407	0.583	0.007	0.020	0.30450
190.00	52.6316	0.748	1.098	0.014	0.014	0.30125
200.00	50.0000	0.896	1.335	0.020	0.017	0.33630
210.00	47.6190	0.980	1.498	0.024	0.019	0.36695
220.00	45.4545	1.002	1.782	0.029	0.026	0.44485
230.00	43.4783	0.651	1.983	0.021	0.035	0.61095
240.00	41.6667	0.398	1.808	0.012	0.032	0.69710
250.00	40.0000	0.301	1.633	0.009	0.027	0.72595
260.00	38.4615	0.244	1.474	0.006	0.024	0.73980
270.00	37.0370	0.216	1.321	0.005	0.021	0.73435
280.00	35.7143	0.208	1.176	0.005	0.018	0.71040
290.00	34.4828	0.202	1.045	0.004	0.016	0.68470
300.00	33.3333	0.194	0.895	0.003	0.014	0.65555
310.00	32.2581	0.222	0.736	0.003	0.011	0.56885
320.00	31.2500	0.269	0.582	0.003	0.010	0.45510
330.00	30.3030	0.340	0.433	0.003	0.008	0.32295
340.00	29.4118	0.426	0.294	0.003	0.007	0.20400
350.00	28.5714	0.569	0.145	0.003	0.006	0.08710
360.00	27.7778	0.764	0.117	0.006	0.005	0.02290
370.00	27.0270	0.843	0.123	0.008	0.007	0.01205
380.00	26.3158	0.947	0.110	0.009	0.014	0.00405
390.00	25.6410	1.038	0.106	0.007	0.018	0.00310
400.00	25.0000	1.104	0.115	0.011	0.013	0.00555
410.00	24.3902	1.155	0.115	0.012	0.011	0.00820
420.00	23.8095	1.215	0.115	0.012	0.009	0.01240
430.00	23.2558	1.255	0.120	0.011	0.009	0.01585
440.00	22.7273	1.304	0.123	0.011	0.009	0.02060
450.00	22.2222	1.335	0.135	0.011	0.010	0.02435
460.00	21.7391	1.370	0.144	0.011	0.010	0.02850
470.00	21.2766	1.401	0.146	0.011	0.010	0.03205
480.00	20.8333	1.428	0.153	0.011	0.011	0.03550
490.00	20.4082	1.462	0.161	0.011	0.011	0.04005
500.00	20.0000	1.493	0.183	0.011	0.012	0.04505
510.00	19.6078	1.493	0.222	0.011	0.012	0.04750
520.00	19.2308	1.488	0.179	0.011	0.012	0.04420
530.00	18.8679	1.525	0.173	0.011	0.013	0.04855
540.00	18.5185	1.558	0.182	0.011	0.013	0.05325
550.00	18.1818	1.580	0.184	0.011	0.014	0.05620
560.00	17.8571	1.609	0.190	0.011	0.014	0.06040
570.00	17.5439	1.639	0.189	0.011	0.015	0.06445
580.00	17.2414	1.664	0.194	0.011	0.015	0.06810
590.00	16.9492	1.695	0.193	0.011	0.016	0.07240
600.00	16.6667	1.745	0.197	0.012	0.017	0.07960
610.00	16.3934	1.805	0.232	0.013	0.019	0.08990
620.00	16.1290	1.845	0.259	0.013	0.020	0.09695
630.00	15.8730	1.911	0.285	0.014	0.022	0.10785
640.00	15.6250	2.012	0.312	0.015	0.025	0.12380
650.00	15.3846	2.198	0.377	0.019	0.030	0.15380
660.00	15.1515	2.637	0.591	0.030	0.046	0.22515
670.00	14.9254	2.880	3.286	0.144	0.035	0.55655

Table 15. Anhydrite E Parallel to X-axis.

PAGE 2

WN	WL	N	K	DN	DK	R
680.00	14.7059	0.319	1.836	0.010	0.033	0.75230
690.00	14.4928	0.165	0.844	0.003	0.013	0.68455
700.00	14.2857	0.569	0.079	0.003	0.005	0.08130
710.00	14.0845	1.001	0.070	0.002	0.028	0.00125
720.00	13.8889	1.157	0.087	0.013	0.010	0.00705
730.00	13.6986	1.243	0.098	0.012	0.008	0.01395
740.00	13.5135	1.306	0.108	0.011	0.009	0.02020
750.00	13.3333	1.355	0.113	0.011	0.009	0.02545
760.00	13.1579	1.394	0.115	0.010	0.010	0.02985
770.00	12.9870	1.429	0.115	0.010	0.010	0.03395
780.00	12.8205	1.450	0.125	0.010	0.011	0.03695
790.00	12.6582	1.476	0.121	0.010	0.011	0.03990
800.00	12.5000	1.499	0.126	0.010	0.011	0.04300
810.00	12.3457	1.517	0.135	0.010	0.012	0.04565
820.00	12.1951	1.538	0.130	0.010	0.012	0.04825
830.00	12.0482	1.552	0.132	0.010	0.013	0.05010
840.00	11.9048	1.563	0.132	0.010	0.013	0.05165
850.00	11.7647	1.578	0.134	0.010	0.013	0.05375
860.00	11.6279	1.589	0.139	0.010	0.013	0.05540
870.00	11.4943	1.610	0.141	0.010	0.014	0.05830
880.00	11.3636	1.623	0.142	0.010	0.014	0.06005
890.00	11.2360	1.632	0.144	0.010	0.014	0.06150
900.00	11.1111	1.644	0.148	0.010	0.015	0.06325
910.00	10.9890	1.655	0.150	0.010	0.015	0.06485
920.00	10.8696	1.667	0.149	0.010	0.015	0.06640
930.00	10.7527	1.684	0.147	0.010	0.015	0.06885
940.00	10.6383	1.695	0.148	0.010	0.016	0.07030
950.00	10.5263	1.713	0.152	0.011	0.016	0.07305
960.00	10.4167	1.730	0.154	0.011	0.017	0.07550
970.00	10.3093	1.744	0.156	0.011	0.017	0.07765
980.00	10.2041	1.763	0.157	0.011	0.017	0.08045
990.00	10.1010	1.786	0.161	0.011	0.018	0.08390
1000.00	10.0000	1.808	0.167	0.011	0.019	0.08730
1010.00	9.9010	1.836	0.192	0.012	0.019	0.09240
1020.00	9.8039	1.830	0.170	0.011	0.019	0.09060
1030.00	9.7087	1.878	0.172	0.011	0.020	0.09755
1040.00	9.6154	1.912	0.180	0.012	0.021	0.10285
1050.00	9.5238	1.952	0.183	0.012	0.023	0.10890
1060.00	9.4340	2.000	0.188	0.012	0.024	0.11605
1070.00	9.3458	2.062	0.200	0.013	0.026	0.12560
1080.00	9.2593	2.130	0.211	0.013	0.028	0.13595
1090.00	9.1743	2.226	0.229	0.014	0.031	0.15040
1100.00	9.0909	2.345	0.256	0.016	0.035	0.16840
1110.00	9.0090	2.519	0.305	0.018	0.042	0.19430
1120.00	8.9286	2.753	0.382	0.023	0.051	0.22825
1130.00	8.8496	3.155	0.545	0.034	0.068	0.28360
1140.00	8.7719	4.018	1.063	0.073	0.111	0.39145
1150.00	8.6957	3.586	4.802	0.263	0.097	0.67640
1160.00	8.6207	0.782	3.289	0.042	0.086	0.77785
1170.00	8.5470	0.411	2.403	0.017	0.050	0.78975

Table 15. Anhydrite E Parallel to X-axis.

PAGE 3

WN	WL	N	K	DN	DK	R
1180.00	8.4746	0.281	1.885	0.009	0.034	0.78525
1190.00	8.4034	0.217	1.520	0.006	0.025	0.77320
1200.00	8.3333	0.201	1.202	0.004	0.018	0.72395
1210.00	8.2645	0.178	1.027	0.003	0.015	0.71090
1220.00	8.1967	0.160	0.780	0.002	0.012	0.67735
1230.00	8.1301	0.152	0.510	0.002	0.010	0.62460
1240.00	8.0645	0.294	0.199	0.001	0.007	0.33310
1250.00	8.0000	0.525	0.097	0.002	0.006	0.10555
1260.00	7.9365	0.671	0.056	0.004	0.005	0.04125
1270.00	7.8740	0.787	0.042	0.007	0.004	0.01520
1280.00	7.8125	0.869	0.039	0.012	0.005	0.00555
1290.00	7.7519	0.945	0.037	0.024	0.015	0.00120
1300.00	7.6923	0.991	0.045	0.010	0.041	0.00055
1310.00	7.6336	1.020	0.042	0.019	0.040	0.00055
1320.00	7.5758	1.062	0.033	0.027	0.016	0.00120
1330.00	7.5188	1.086	0.034	0.023	0.011	0.00200
1340.00	7.4627	1.122	0.035	0.018	0.007	0.00365
1350.00	7.4074	1.146	0.036	0.016	0.006	0.00500
1360.00	7.3529	1.168	0.036	0.015	0.006	0.00640
1370.00	7.2993	1.188	0.037	0.014	0.006	0.00780
1380.00	7.2464	1.205	0.038	0.013	0.006	0.00915
1390.00	7.1942	1.220	0.039	0.013	0.006	0.01030
1400.00	7.1429	1.234	0.038	0.012	0.006	0.01145
1410.00	7.0922	1.247	0.038	0.012	0.006	0.01265
1420.00	7.0423	1.259	0.038	0.012	0.006	0.01370
1430.00	6.9930	1.271	0.037	0.011	0.006	0.01480
1440.00	6.9444	1.283	0.037	0.011	0.006	0.01590
1450.00	6.8966	1.293	0.039	0.011	0.007	0.01695
1460.00	6.8493	1.302	0.040	0.011	0.007	0.01780
1470.00	6.8027	1.310	0.039	0.010	0.007	0.01865
1480.00	6.7568	1.318	0.039	0.010	0.007	0.01950
1490.00	6.7114	1.327	0.040	0.010	0.007	0.02040
1500.00	6.6667	1.334	0.041	0.010	0.007	0.02115
1510.00	6.6225	1.340	0.041	0.010	0.007	0.02185
1520.00	6.5789	1.346	0.041	0.010	0.007	0.02250
1530.00	6.5359	1.352	0.041	0.010	0.007	0.02310
1540.00	6.4935	1.358	0.040	0.010	0.007	0.02380
1550.00	6.4516	1.364	0.041	0.010	0.008	0.02450
1560.00	6.4103	1.370	0.042	0.010	0.008	0.02520
1570.00	6.3694	1.375	0.043	0.010	0.008	0.02575
1580.00	6.3291	1.380	0.044	0.010	0.008	0.02635
1590.00	6.2893	1.384	0.045	0.010	0.008	0.02675
1600.00	6.2500	1.387	0.046	0.010	0.008	0.02715
1610.00	6.2112	1.390	0.047	0.010	0.008	0.02750
1620.00	6.1728	1.393	0.046	0.010	0.008	0.02785
1630.00	6.1350	1.396	0.045	0.009	0.008	0.02820
1640.00	6.0976	1.400	0.045	0.009	0.008	0.02870
1650.00	6.0606	1.404	0.046	0.009	0.008	0.02910
1660.00	6.0241	1.406	0.047	0.009	0.008	0.02940
1670.00	5.9880	1.409	0.047	0.009	0.009	0.02970

Table 15. Anhydrite E Parallel to X-axis.

PAGE 4

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.411	0.047	0.009	0.009	0.02995
1690.00	5.9172	1.413	0.047	0.009	0.009	0.03015
1700.00	5.8824	1.415	0.046	0.009	0.009	0.03040
1710.00	5.8480	1.418	0.045	0.009	0.009	0.03075
1720.00	5.8140	1.420	0.045	0.009	0.009	0.03105
1730.00	5.7803	1.422	0.045	0.009	0.009	0.03125
1740.00	5.7471	1.424	0.044	0.009	0.009	0.03150
1750.00	5.7143	1.427	0.043	0.009	0.009	0.03180
1760.00	5.6818	1.430	0.042	0.009	0.009	0.03220
1770.00	5.6497	1.433	0.043	0.009	0.009	0.03255
1780.00	5.6180	1.435	0.043	0.009	0.009	0.03275
1790.00	5.5866	1.436	0.043	0.009	0.009	0.03290
1800.00	5.5556	1.438	0.042	0.009	0.009	0.03315
1810.00	5.5249	1.440	0.042	0.009	0.009	0.03340
1820.00	5.4945	1.443	0.041	0.009	0.009	0.03370
1830.00	5.4645	1.445	0.041	0.009	0.009	0.03400
1840.00	5.4348	1.447	0.041	0.009	0.009	0.03430
1850.00	5.4054	1.449	0.042	0.009	0.009	0.03450
1860.00	5.3763	1.450	0.041	0.009	0.009	0.03465
1870.00	5.3476	1.452	0.041	0.009	0.009	0.03490
1880.00	5.3191	1.455	0.041	0.009	0.009	0.03520
1890.00	5.2910	1.456	0.041	0.009	0.009	0.03540
1900.00	5.2632	1.458	0.041	0.009	0.009	0.03560
1910.00	5.2356	1.460	0.041	0.009	0.009	0.03585
1920.00	5.2083	1.462	0.041	0.009	0.009	0.03615
1930.00	5.1813	1.465	0.042	0.009	0.009	0.03645
1940.00	5.1546	1.466	0.043	0.009	0.009	0.03665
1950.00	5.1282	1.467	0.045	0.009	0.010	0.03680
1960.00	5.1020	1.467	0.046	0.009	0.010	0.03680
1970.00	5.0761	1.467	0.046	0.009	0.010	0.03680
1980.00	5.0505	1.467	0.045	0.009	0.010	0.03675
1990.00	5.0251	1.469	0.044	0.009	0.010	0.03700
2000.00	5.0000	1.470	0.045	0.009	0.010	0.03715
2010.00	4.9751	1.471	0.046	0.009	0.010	0.03730
2020.00	4.9505	1.470	0.046	0.009	0.010	0.03720
2030.00	4.9261	1.471	0.044	0.009	0.010	0.03730
2040.00	4.9020	1.472	0.044	0.009	0.010	0.03745
2050.00	4.8780	1.475	0.044	0.009	0.010	0.03775
2060.00	4.8544	1.476	0.045	0.009	0.010	0.03795
2070.00	4.8309	1.477	0.046	0.009	0.010	0.03805
2080.00	4.8077	1.478	0.047	0.009	0.010	0.03820
2090.00	4.7847	1.478	0.049	0.009	0.010	0.03825
2100.00	4.7619	1.478	0.051	0.009	0.010	0.03830
2110.00	4.7393	1.476	0.053	0.009	0.010	0.03810
2120.00	4.7170	1.474	0.053	0.009	0.010	0.03785
2130.00	4.6948	1.472	0.054	0.009	0.010	0.03750
2140.00	4.6729	1.468	0.053	0.009	0.010	0.03710
2150.00	4.6512	1.465	0.048	0.009	0.010	0.03665
2160.00	4.6296	1.465	0.044	0.009	0.009	0.03655
2170.00	4.6083	1.468	0.041	0.009	0.009	0.03690

Table 15. Anhydrite E Parallel to X-axis.

PAGE 5

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.471	0.040	0.009	0.010	0.03720
2190.00	4.5662	1.471	0.040	0.009	0.010	0.03725
2200.00	4.5455	1.472	0.040	0.009	0.010	0.03730
2210.00	4.5249	1.472	0.039	0.009	0.010	0.03735
2220.00	4.5045	1.472	0.039	0.009	0.010	0.03730
2230.00	4.4843	1.470	0.038	0.009	0.009	0.03710
2240.00	4.4643	1.468	0.036	0.009	0.009	0.03685
2250.00	4.4444	1.468	0.032	0.009	0.009	0.03680
2260.00	4.4248	1.470	0.028	0.009	0.009	0.03695
2270.00	4.4053	1.472	0.026	0.009	0.009	0.03725
2280.00	4.3860	1.474	0.025	0.009	0.009	0.03750
2290.00	4.3668	1.476	0.023	0.008	0.009	0.03765
2300.00	4.3478	1.478	0.022	0.008	0.009	0.03790
2310.00	4.3290	1.479	0.021	0.008	0.009	0.03810
2320.00	4.3103	1.481	0.021	0.008	0.009	0.03830
2330.00	4.2918	1.481	0.020	0.008	0.009	0.03835
2340.00	4.2735	1.481	0.018	0.008	0.009	0.03835
2350.00	4.2553	1.484	0.016	0.008	0.009	0.03870
2360.00	4.2373	1.486	0.016	0.008	0.009	0.03895
2370.00	4.2194	1.488	0.015	0.008	0.009	0.03915
2380.00	4.2017	1.489	0.014	0.008	0.009	0.03935
2390.00	4.1841	1.491	0.013	0.008	0.009	0.03960
2400.00	4.1667	1.493	0.013	0.008	0.009	0.03980
2410.00	4.1494	1.495	0.012	0.008	0.009	0.04005
2420.00	4.1322	1.496	0.012	0.008	0.010	0.04025
2430.00	4.1152	1.498	0.012	0.008	0.010	0.04050
2440.00	4.0984	1.500	0.011	0.008	0.010	0.04070
2450.00	4.0816	1.502	0.011	0.008	0.010	0.04095
2460.00	4.0650	1.503	0.011	0.008	0.010	0.04115
2470.00	4.0486	1.505	0.011	0.008	0.010	0.04130
2480.00	4.0323	1.506	0.011	0.008	0.010	0.04150
2490.00	4.0161	1.507	0.011	0.008	0.010	0.04165
2500.00	4.0000	1.509	0.012	0.008	0.010	0.04185
2510.00	3.9841	1.510	0.012	0.008	0.010	0.04200
2520.00	3.9683	1.511	0.011	0.008	0.010	0.04215
2530.00	3.9526	1.512	0.012	0.008	0.010	0.04230
2540.00	3.9370	1.514	0.011	0.008	0.010	0.04250
2550.00	3.9216	1.515	0.012	0.008	0.010	0.04265
2560.00	3.9063	1.516	0.012	0.008	0.010	0.04285
2570.00	3.8911	1.518	0.012	0.008	0.010	0.04300
2580.00	3.8760	1.519	0.012	0.008	0.010	0.04320
2590.00	3.8610	1.521	0.012	0.008	0.010	0.04340
2600.00	3.8462	1.522	0.013	0.008	0.010	0.04360
2610.00	3.8314	1.523	0.014	0.008	0.010	0.04375
2620.00	3.8168	1.524	0.015	0.008	0.010	0.04390
2630.00	3.8023	1.525	0.015	0.008	0.010	0.04400
2640.00	3.7879	1.526	0.016	0.008	0.010	0.04410
2650.00	3.7736	1.526	0.017	0.008	0.010	0.04420
2660.00	3.7594	1.527	0.018	0.008	0.010	0.04425
2670.00	3.7453	1.527	0.018	0.008	0.010	0.04430



Table 15. Anhydrite E Parallel to X-axis.

PAGE 6

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.527	0.019	0.008	0.010	0.04435
2690.00	3.7175	1.528	0.019	0.008	0.010	0.04445
2700.00	3.7037	1.529	0.019	0.008	0.010	0.04450
2710.00	3.6900	1.529	0.020	0.008	0.010	0.04455
2720.00	3.6765	1.530	0.020	0.008	0.010	0.04465
2730.00	3.6630	1.530	0.021	0.008	0.010	0.04470
2740.00	3.6496	1.530	0.021	0.008	0.010	0.04475
2750.00	3.6364	1.531	0.021	0.008	0.010	0.04485
2760.00	3.6232	1.532	0.022	0.008	0.010	0.04495
2770.00	3.6101	1.532	0.023	0.008	0.011	0.04500
2780.00	3.5971	1.533	0.023	0.008	0.011	0.04505
2790.00	3.5842	1.533	0.024	0.008	0.011	0.04505
2800.00	3.5714	1.533	0.025	0.008	0.011	0.04510
2810.00	3.5587	1.533	0.025	0.008	0.011	0.04515
2820.00	3.5461	1.534	0.026	0.008	0.011	0.04520
2830.00	3.5336	1.533	0.027	0.008	0.011	0.04515
2840.00	3.5211	1.533	0.027	0.008	0.011	0.04515
2850.00	3.5088	1.533	0.028	0.008	0.011	0.04510
2860.00	3.4965	1.533	0.028	0.008	0.011	0.04510
2870.00	3.4843	1.532	0.028	0.008	0.011	0.04500
2880.00	3.4722	1.531	0.028	0.008	0.011	0.04495
2890.00	3.4602	1.531	0.028	0.008	0.011	0.04490
2900.00	3.4483	1.531	0.028	0.008	0.011	0.04490
2910.00	3.4364	1.531	0.028	0.008	0.011	0.04485
2920.00	3.4247	1.531	0.028	0.008	0.011	0.04485
2930.00	3.4130	1.531	0.028	0.008	0.011	0.04485
2940.00	3.4014	1.531	0.028	0.008	0.011	0.04485
2950.00	3.3898	1.531	0.028	0.008	0.011	0.04485
2960.00	3.3784	1.531	0.028	0.008	0.011	0.04485
2970.00	3.3670	1.531	0.027	0.008	0.011	0.04485
2980.00	3.3557	1.531	0.028	0.008	0.011	0.04490
2990.00	3.3445	1.531	0.028	0.008	0.011	0.04490
3000.00	3.3333	1.531	0.028	0.008	0.011	0.04490
3010.00	3.3223	1.531	0.028	0.008	0.011	0.04490
3020.00	3.3113	1.531	0.028	0.008	0.011	0.04490
3030.00	3.3003	1.531	0.028	0.008	0.011	0.04490
3040.00	3.2895	1.531	0.029	0.008	0.011	0.04490
3050.00	3.2787	1.531	0.029	0.008	0.011	0.04485
3060.00	3.2680	1.530	0.029	0.008	0.011	0.04475
3070.00	3.2573	1.530	0.029	0.008	0.011	0.04470
3080.00	3.2468	1.529	0.029	0.008	0.011	0.04460
3090.00	3.2362	1.528	0.029	0.008	0.011	0.04450
3100.00	3.2258	1.528	0.028	0.008	0.010	0.04445
3110.00	3.2154	1.527	0.028	0.008	0.010	0.04440
3120.00	3.2051	1.527	0.027	0.008	0.010	0.04435
3130.00	3.1949	1.527	0.027	0.008	0.010	0.04430
3140.00	3.1847	1.526	0.026	0.008	0.010	0.04425
3150.00	3.1746	1.526	0.025	0.008	0.010	0.04420
3160.00	3.1646	1.526	0.025	0.008	0.010	0.04415
3170.00	3.1546	1.525	0.024	0.008	0.010	0.04410

Table 15. Anhydrite E Parallel to X-axis.

PAGE 7

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.525	0.023	0.008	0.010	0.04405
3190.00	3.1348	1.525	0.022	0.008	0.010	0.04405
3200.00	3.1250	1.525	0.021	0.008	0.010	0.04405
3210.00	3.1153	1.525	0.020	0.008	0.010	0.04405
3220.00	3.1056	1.526	0.019	0.008	0.010	0.04410
3230.00	3.0960	1.526	0.018	0.008	0.010	0.04410
3240.00	3.0864	1.526	0.017	0.008	0.010	0.04420
3250.00	3.0769	1.527	0.017	0.008	0.010	0.04425
3260.00	3.0675	1.527	0.016	0.008	0.010	0.04425
3270.00	3.0581	1.527	0.016	0.008	0.010	0.04430
3280.00	3.0488	1.527	0.015	0.008	0.010	0.04430
3290.00	3.0395	1.528	0.015	0.008	0.010	0.04435
3300.00	3.0303	1.528	0.013	0.008	0.010	0.04440
3310.00	3.0211	1.528	0.013	0.008	0.010	0.04445
3320.00	3.0120	1.529	0.012	0.008	0.010	0.04450
3330.00	3.0030	1.530	0.011	0.008	0.010	0.04460
3340.00	2.9940	1.530	0.010	0.008	0.010	0.04470
3350.00	2.9851	1.531	0.010	0.008	0.010	0.04480
3360.00	2.9762	1.532	0.010	0.008	0.010	0.04485
3370.00	2.9674	1.532	0.009	0.008	0.009	0.04495
3380.00	2.9586	1.533	0.009	0.008	0.009	0.04505
3390.00	2.9499	1.533	0.008	0.008	0.008	0.04510
3400.00	2.9412	1.534	0.008	0.008	0.008	0.04520
3410.00	2.9326	1.535	0.008	0.008	0.008	0.04525
3420.00	2.9240	1.535	0.008	0.008	0.008	0.04535
3430.00	2.9155	1.536	0.007	0.008	0.007	0.04540
3440.00	2.9070	1.536	0.007	0.008	0.007	0.04545
3450.00	2.8986	1.536	0.007	0.008	0.007	0.04550
3460.00	2.8902	1.537	0.006	0.008	0.006	0.04560
3470.00	2.8818	1.538	0.006	0.008	0.006	0.04565
3480.00	2.8736	1.538	0.006	0.008	0.006	0.04570
3490.00	2.8653	1.538	0.006	0.008	0.006	0.04575
3500.00	2.8571	1.539	0.006	0.008	0.006	0.04580
3510.00	2.8490	1.539	0.005	0.008	0.005	0.04585
3520.00	2.8409	1.539	0.005	0.008	0.005	0.04585
3530.00	2.8329	1.540	0.005	0.008	0.005	0.04590
3540.00	2.8249	1.540	0.004	0.008	0.004	0.04595
3550.00	2.8169	1.540	0.004	0.008	0.004	0.04600
3560.00	2.8090	1.541	0.003	0.008	0.003	0.04605
3570.00	2.8011	1.541	0.003	0.008	0.003	0.04610
3580.00	2.7933	1.541	0.003	0.008	0.003	0.04615
3590.00	2.7855	1.542	0.002	0.008	0.002	0.04620
3600.00	2.7778	1.543	0.001	0.008	0.001	0.04630
3610.00	2.7701	1.543	0.001	0.008	0.001	0.04635
3620.00	2.7624	1.544	0.000	0.008	0.000	0.04645
3630.00	2.7548	1.544	0.000	0.008	0.001	0.04655
3640.00	2.7473	1.546	0.000	0.008	0.001	0.04670
3650.00	2.7397	1.546	0.000	0.008	0.002	0.04680
3660.00	2.7322	1.547	0.000	0.008	0.002	0.04695
3670.00	2.7248	1.549	0.000	0.008	0.003	0.04710

Table 15. Anhydrite E Parallel to X-axis.

PAGE 8

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.550	0.000	0.008	0.003	0.04725
3690.00	2.7100	1.551	0.000	0.008	0.003	0.04740
3700.00	2.7027	1.552	0.000	0.008	0.003	0.04755
3710.00	2.6954	1.553	0.000	0.008	0.003	0.04765
3720.00	2.6882	1.554	0.000	0.008	0.003	0.04780
3730.00	2.6810	1.555	0.000	0.008	0.003	0.04795
3740.00	2.6738	1.556	0.000	0.008	0.002	0.04805
3750.00	2.6667	1.556	0.000	0.008	0.002	0.04815
3760.00	2.6596	1.557	0.000	0.008	0.001	0.04825
3770.00	2.6525	1.558	0.000	0.008	0.001	0.04835
3780.00	2.6455	1.558	0.000	0.008	0.000	0.04840
3790.00	2.6385	1.559	0.000	0.008	0.000	0.04845
3800.00	2.6316	1.559	0.001	0.008	0.001	0.04850
3810.00	2.6247	1.559	0.001	0.008	0.001	0.04850
3820.00	2.6178	1.559	0.002	0.008	0.002	0.04850
3830.00	2.6110	1.559	0.002	0.008	0.002	0.04850
3840.00	2.6042	1.559	0.002	0.008	0.002	0.04850
3850.00	2.5974	1.559	0.002	0.008	0.002	0.04850
3860.00	2.5907	1.559	0.002	0.008	0.002	0.04855
3870.00	2.5840	1.559	0.002	0.008	0.002	0.04855
3880.00	2.5773	1.559	0.002	0.008	0.002	0.04855
3890.00	2.5707	1.559	0.002	0.008	0.002	0.04855
3900.00	2.5641	1.559	0.002	0.008	0.002	0.04855
3910.00	2.5575	1.559	0.002	0.008	0.002	0.04850
3920.00	2.5510	1.559	0.001	0.008	0.001	0.04850
3930.00	2.5445	1.559	0.001	0.008	0.001	0.04850
3940.00	2.5381	1.559	0.001	0.008	0.001	0.04850
3950.00	2.5316	1.559	0.000	0.007	0.000	0.04850
3960.00	2.5253	1.559	0.000	0.008	0.000	0.04855
3970.00	2.5189	1.559	0.000	0.008	0.001	0.04855
3980.00	2.5126	1.559	0.000	0.008	0.001	0.04855
3990.00	2.5063	1.559	0.000	0.008	0.002	0.04855
4000.00	2.5000	1.559	0.000	0.008	0.003	0.04855

ANHYDRITE: Y-DIRECTION

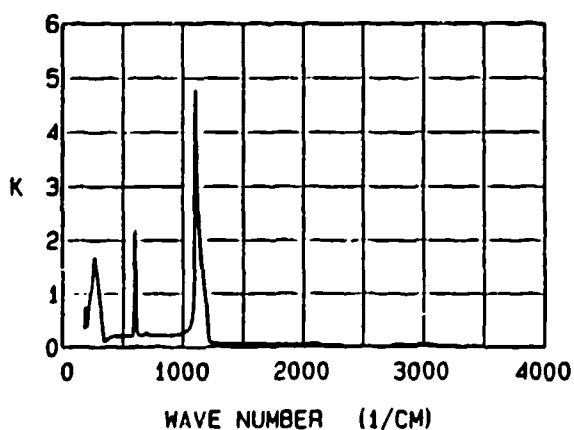
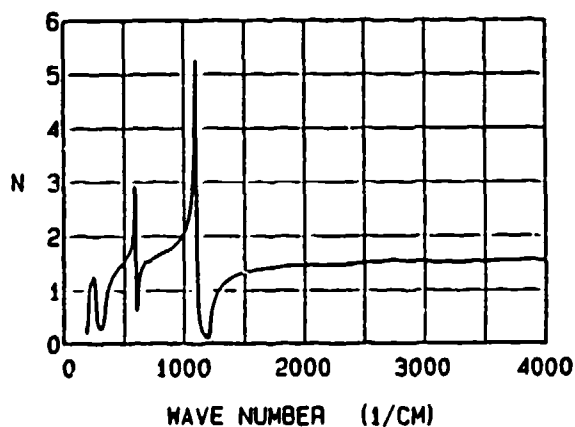
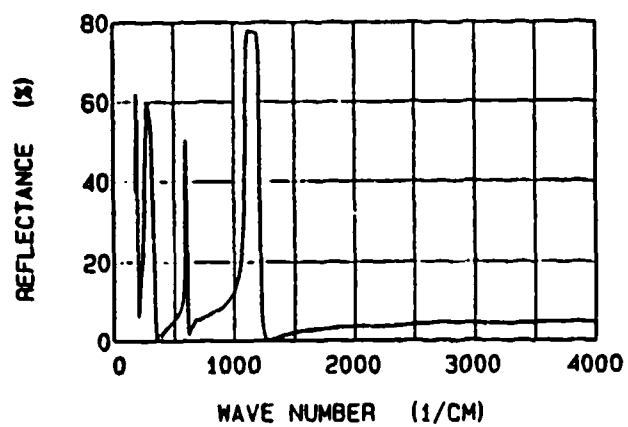


Figure 30. The infrared (180-4,000  $\text{cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of anhydrite, E/Y .

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	0.281	0.342	0.009	0.020	0.37380
190.00	52.5316	0.186	0.724	0.003	0.011	0.61920
200.00	50.0000	0.438	0.388	0.004	0.008	0.21690
210.00	47.6190	0.986	0.549	0.009	0.006	0.07250
220.00	45.4545	1.099	0.797	0.014	0.007	0.13005
230.00	43.4763	1.160	0.977	0.018	0.008	0.17655
240.00	41.6667	1.227	1.123	0.021	0.009	0.21345
250.00	40.0000	1.235	1.374	0.026	0.013	0.28485
260.00	38.4615	0.995	1.633	0.026	0.022	0.40400
270.00	37.0370	0.601	1.612	0.016	0.025	0.53730
280.00	35.7143	0.381	1.356	0.009	0.021	0.59635
290.00	34.4828	0.324	1.137	0.006	0.017	0.57830
300.00	33.3333	0.287	0.952	0.005	0.014	0.55550
310.00	32.2581	0.271	0.752	0.004	0.011	0.50900
320.00	31.2500	0.308	0.527	0.003	0.009	0.38810
330.00	30.3030	0.418	0.320	0.003	0.007	0.21675
340.00	29.4118	0.577	0.124	0.003	0.005	0.08120
350.00	28.5714	0.803	0.104	0.007	0.005	0.01575
360.00	27.7778	0.955	0.131	0.007	0.013	0.00510
370.00	27.0270	1.054	0.141	0.006	0.014	0.00550
380.00	26.3158	1.120	0.163	0.009	0.012	0.00930
390.00	25.6410	1.182	0.174	0.010	0.010	0.01355
400.00	25.0000	1.237	0.178	0.010	0.010	0.01780
410.00	24.3902	1.275	0.194	0.010	0.010	0.02215
420.00	23.8095	1.310	0.203	0.011	0.010	0.02600
430.00	23.2558	1.341	0.204	0.011	0.010	0.02915
440.00	22.7273	1.375	0.205	0.011	0.011	0.03275
450.00	22.2222	1.409	0.207	0.011	0.011	0.03665
460.00	21.7391	1.438	0.215	0.011	0.011	0.04040
470.00	21.2766	1.463	0.213	0.011	0.012	0.04320
480.00	20.8333	1.489	0.213	0.011	0.012	0.04645
490.00	20.4082	1.512	0.210	0.011	0.012	0.04895
500.00	20.0000	1.544	0.220	0.011	0.013	0.05370
510.00	19.6078	1.568	0.222	0.011	0.014	0.05690
520.00	19.2308	1.597	0.213	0.011	0.014	0.06015
530.00	18.8679	1.631	0.215	0.012	0.015	0.06475
540.00	18.5185	1.671	0.220	0.012	0.016	0.07045
550.00	18.1818	1.725	0.219	0.012	0.017	0.07790
560.00	17.8571	1.795	0.217	0.012	0.018	0.08765
570.00	17.5439	1.930	0.212	0.012	0.022	0.10675
580.00	17.2414	2.329	0.202	0.014	0.034	0.16420
590.00	16.9492	2.771	2.017	0.085	0.027	0.39630
600.00	16.6667	0.632	1.385	0.014	0.020	0.45165
610.00	16.3934	0.767	0.469	0.007	0.007	0.08400
620.00	16.1290	1.133	0.233	0.008	0.010	0.01595
630.00	15.8730	1.279	0.225	0.010	0.010	0.02500
640.00	15.6250	1.364	0.219	0.011	0.011	0.03260
650.00	15.3846	1.423	0.210	0.011	0.011	0.03840
660.00	15.1515	1.463	0.211	0.011	0.012	0.04310
670.00	14.9254	1.513	0.212	0.011	0.013	0.04925

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 2

WN	WL	N	K	DN	DK	R
680.00	14.7059	1.533	0.244	0.012	0.013	0.05400
690.00	14.4928	1.536	0.266	0.012	0.013	0.05595
700.00	14.2857	1.513	0.256	0.012	0.013	0.05235
710.00	14.0845	1.535	0.239	0.012	0.013	0.05380
720.00	13.8889	1.547	0.226	0.011	0.013	0.05445
730.00	13.6986	1.570	0.222	0.011	0.014	0.05710
740.00	13.5135	1.580	0.221	0.011	0.014	0.05835
750.00	13.3333	1.591	0.215	0.011	0.014	0.05945
760.00	13.1579	1.606	0.215	0.011	0.014	0.06140
770.00	12.9870	1.612	0.212	0.011	0.014	0.06205
780.00	12.8205	1.629	0.205	0.011	0.015	0.06395
790.00	12.6582	1.644	0.205	0.011	0.015	0.06600
800.00	12.5000	1.657	0.206	0.011	0.015	0.06780
810.00	12.3457	1.672	0.213	0.012	0.016	0.07025
820.00	12.1951	1.687	0.208	0.012	0.016	0.07205
830.00	12.0482	1.693	0.212	0.012	0.016	0.07305
840.00	11.9048	1.707	0.211	0.012	0.016	0.07495
850.00	11.7647	1.719	0.216	0.012	0.017	0.07680
860.00	11.6279	1.729	0.214	0.012	0.017	0.07815
870.00	11.4943	1.741	0.217	0.012	0.017	0.08000
880.00	11.3636	1.754	0.218	0.012	0.017	0.08185
890.00	11.2360	1.763	0.218	0.012	0.018	0.08315
900.00	11.1111	1.776	0.212	0.012	0.018	0.08470
910.00	10.9890	1.803	0.213	0.012	0.019	0.08855
920.00	10.8696	1.821	0.213	0.012	0.019	0.09115
930.00	10.7527	1.846	0.216	0.012	0.020	0.09485
940.00	10.6383	1.865	0.227	0.013	0.020	0.09810
950.00	10.5263	1.889	0.225	0.013	0.021	0.10155
960.00	10.4167	1.912	0.228	0.013	0.021	0.10500
970.00	10.3093	1.946	0.231	0.013	0.022	0.11005
980.00	10.2041	1.978	0.239	0.013	0.023	0.11500
990.00	10.1010	2.012	0.249	0.014	0.024	0.12045
1000.00	10.0000	2.056	0.252	0.014	0.026	0.12690
1010.00	9.9010	2.115	0.255	0.014	0.027	0.13560
1020.00	9.8039	2.182	0.273	0.015	0.029	0.14595
1030.00	9.7087	2.251	0.291	0.016	0.032	0.15655
1040.00	9.6154	2.353	0.308	0.017	0.035	0.17165
1050.00	9.5238	2.491	0.333	0.019	0.040	0.19165
1060.00	9.4340	2.677	0.375	0.022	0.047	0.21825
1070.00	9.3458	2.966	0.447	0.027	0.059	0.25740
1080.00	9.2593	3.480	0.620	0.041	0.083	0.32180
1090.00	9.1743	4.831	1.355	0.109	0.159	0.46305
1100.00	9.0909	2.390	4.774	0.176	0.142	0.72270
1110.00	9.0090	0.938	3.417	0.052	0.090	0.75825
1120.00	8.9286	0.509	2.633	0.022	0.058	0.78055
1130.00	8.8496	0.356	2.148	0.013	0.041	0.78095
1140.00	8.7719	0.270	1.804	0.009	0.031	0.77950
1150.00	8.6957	0.217	1.528	0.006	0.025	0.77410
1160.00	8.6207	0.177	1.300	0.004	0.020	0.77225
1170.00	8.5470	0.144	1.088	0.003	0.016	0.77090

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 3

WN	WL	N	K	DN	DK	R
1180.00	8.4746	0.116	0.882	0.002	0.013	0.77435
1190.00	8.4034	0.100	0.656	0.001	0.011	0.75955
1200.00	8.3333	0.121	0.367	0.001	0.009	0.66600
1210.00	8.2645	0.375	0.114	0.001	0.006	0.22595
1220.00	8.1967	0.596	0.092	0.003	0.005	0.07015
1230.00	8.1301	0.696	0.097	0.005	0.005	0.03660
1240.00	8.0645	0.774	0.081	0.006	0.005	0.01885
1250.00	8.0000	0.852	0.075	0.010	0.006	0.00825
1260.00	7.9365	0.899	0.073	0.012	0.009	0.00440
1270.00	7.8740	0.964	0.072	0.012	0.021	0.00170
1280.00	7.8125	0.995	0.071	0.004	0.028	0.00130
1290.00	7.7519	1.013	0.063	0.006	0.031	0.00105
1300.00	7.6923	1.066	0.065	0.017	0.018	0.00205
1310.00	7.6336	1.090	0.063	0.017	0.014	0.00285
1320.00	7.5758	1.114	0.067	0.016	0.011	0.00400
1330.00	7.5188	1.135	0.067	0.015	0.010	0.00515
1340.00	7.4627	1.151	0.069	0.015	0.009	0.00605
1350.00	7.4074	1.166	0.065	0.014	0.008	0.00695
1360.00	7.3529	1.184	0.063	0.014	0.008	0.00810
1370.00	7.2993	1.200	0.062	0.013	0.007	0.00925
1380.00	7.2464	1.214	0.061	0.013	0.007	0.01035
1390.00	7.1942	1.228	0.062	0.012	0.007	0.01150
1400.00	7.1429	1.242	0.062	0.012	0.007	0.01265
1410.00	7.0922	1.251	0.063	0.012	0.007	0.01350
1420.00	7.0423	1.262	0.061	0.012	0.007	0.01440
1430.00	6.9930	1.273	0.061	0.011	0.007	0.01540
1440.00	6.9444	1.283	0.062	0.011	0.007	0.01640
1450.00	6.8966	1.290	0.064	0.011	0.007	0.01715
1460.00	6.8493	1.297	0.062	0.011	0.007	0.01775
1470.00	6.8027	1.305	0.062	0.011	0.007	0.01855
1480.00	6.7568	1.312	0.062	0.011	0.007	0.01930
1490.00	6.7114	1.319	0.062	0.011	0.008	0.01995
1500.00	6.6667	1.325	0.060	0.010	0.008	0.02060
1510.00	6.6225	1.334	0.060	0.010	0.008	0.02155
1520.00	6.5789	1.341	0.063	0.010	0.008	0.02230
1530.00	6.5359	1.345	0.065	0.010	0.008	0.02285
1540.00	6.4935	1.349	0.064	0.010	0.008	0.02320
1550.00	6.4516	1.352	0.064	0.010	0.008	0.02360
1560.00	6.4103	1.357	0.064	0.010	0.008	0.02415
1570.00	6.3694	1.361	0.065	0.010	0.008	0.02460
1580.00	6.3291	1.365	0.063	0.010	0.008	0.02495
1590.00	6.2893	1.369	0.064	0.010	0.008	0.02545
1600.00	6.2500	1.372	0.065	0.010	0.008	0.02585
1610.00	6.2112	1.374	0.066	0.010	0.008	0.02605
1620.00	6.1728	1.374	0.064	0.010	0.008	0.02605
1630.00	6.1350	1.377	0.061	0.010	0.009	0.02625
1640.00	6.0976	1.381	0.057	0.010	0.008	0.02670
1650.00	6.0606	1.388	0.056	0.010	0.008	0.02740
1660.00	6.0241	1.393	0.057	0.010	0.008	0.02800
1670.00	5.9880	1.395	0.058	0.010	0.008	0.02835

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 4

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.398	0.059	0.010	0.008	0.02865
1690.00	5.9172	1.399	0.057	0.010	0.008	0.02875
1700.00	5.8824	1.403	0.056	0.010	0.009	0.02915
1710.00	5.8480	1.406	0.055	0.010	0.009	0.02955
1720.00	5.8140	1.409	0.056	0.010	0.009	0.02985
1730.00	5.7803	1.411	0.057	0.010	0.009	0.03010
1740.00	5.7471	1.413	0.056	0.009	0.009	0.03035
1750.00	5.7143	1.415	0.056	0.009	0.009	0.03060
1760.00	5.6818	1.417	0.055	0.009	0.009	0.03085
1770.00	5.6497	1.419	0.054	0.009	0.009	0.03105
1780.00	5.6180	1.421	0.054	0.009	0.009	0.03125
1790.00	5.5866	1.421	0.053	0.009	0.009	0.03130
1800.00	5.5556	1.424	0.050	0.009	0.009	0.03155
1810.00	5.5249	1.427	0.049	0.009	0.009	0.03195
1820.00	5.4945	1.430	0.050	0.009	0.009	0.03235
1830.00	5.4645	1.432	0.050	0.009	0.009	0.03255
1840.00	5.4348	1.434	0.048	0.009	0.009	0.03270
1850.00	5.4054	1.436	0.047	0.009	0.009	0.03300
1860.00	5.3763	1.439	0.046	0.009	0.009	0.03330
1870.00	5.3476	1.442	0.046	0.009	0.009	0.03370
1880.00	5.3191	1.444	0.045	0.009	0.009	0.03395
1890.00	5.2910	1.448	0.044	0.009	0.009	0.03445
1900.00	5.2632	1.452	0.044	0.009	0.009	0.03495
1910.00	5.2356	1.457	0.046	0.009	0.009	0.03550
1920.00	5.2083	1.459	0.049	0.009	0.009	0.03580
1930.00	5.1813	1.460	0.052	0.009	0.009	0.03600
1940.00	5.1546	1.460	0.055	0.009	0.009	0.03605
1950.00	5.1282	1.458	0.056	0.009	0.009	0.03585
1960.00	5.1020	1.457	0.054	0.009	0.009	0.03575
1970.00	5.0761	1.459	0.053	0.009	0.009	0.03590
1980.00	5.0505	1.460	0.052	0.009	0.009	0.03600
1990.00	5.0251	1.461	0.052	0.009	0.009	0.03620
2000.00	5.0000	1.464	0.052	0.009	0.010	0.03650
2010.00	4.9751	1.465	0.053	0.009	0.010	0.03670
2020.00	4.9505	1.466	0.055	0.009	0.010	0.03680
2030.00	4.9261	1.466	0.056	0.009	0.010	0.03690
2040.00	4.9020	1.467	0.056	0.009	0.010	0.03695
2050.00	4.8780	1.466	0.058	0.009	0.010	0.03685
2060.00	4.8544	1.465	0.057	0.009	0.010	0.03675
2070.00	4.8309	1.465	0.056	0.009	0.010	0.03670
2080.00	4.8077	1.466	0.055	0.009	0.010	0.03680
2090.00	4.7847	1.468	0.055	0.009	0.010	0.03705
2100.00	4.7619	1.469	0.057	0.009	0.010	0.03725
2110.00	4.7393	1.467	0.063	0.009	0.010	0.03715
2120.00	4.7170	1.459	0.064	0.009	0.010	0.03615
2130.00	4.6948	1.453	0.057	0.009	0.009	0.03520
2140.00	4.6729	1.453	0.047	0.009	0.009	0.03505
2150.00	4.6512	1.460	0.043	0.009	0.009	0.03585
2160.00	4.6296	1.464	0.043	0.009	0.009	0.03635
2170.00	4.6083	1.466	0.043	0.009	0.009	0.03665



Table 16. Anhydrite E Parallel to Y-axis.

PAGE 5

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.466	0.044	0.009	0.009	0.03665
2190.00	4.5662	1.467	0.042	0.009	0.009	0.03670
2200.00	4.5455	1.469	0.041	0.009	0.009	0.03695
2210.00	4.5249	1.470	0.041	0.009	0.009	0.03715
2220.00	4.5045	1.472	0.042	0.009	0.009	0.03735
2230.00	4.4843	1.471	0.042	0.009	0.009	0.03725
2240.00	4.4643	1.471	0.041	0.009	0.009	0.03725
2250.00	4.4444	1.471	0.041	0.009	0.009	0.03725
2260.00	4.4248	1.472	0.040	0.009	0.009	0.03740
2270.00	4.4053	1.473	0.040	0.009	0.009	0.03745
2280.00	4.3860	1.472	0.041	0.009	0.009	0.03735
2290.00	4.3668	1.470	0.040	0.009	0.009	0.03705
2300.00	4.3478	1.468	0.036	0.009	0.009	0.03680
2310.00	4.3290	1.468	0.032	0.009	0.009	0.03670
2320.00	4.3103	1.469	0.029	0.009	0.009	0.03690
2330.00	4.2918	1.472	0.026	0.009	0.009	0.03720
2340.00	4.2735	1.474	0.024	0.008	0.009	0.03750
2350.00	4.2553	1.478	0.024	0.008	0.009	0.03790
2360.00	4.2373	1.479	0.023	0.008	0.009	0.03805
2370.00	4.2194	1.480	0.022	0.008	0.009	0.03825
2380.00	4.2017	1.482	0.021	0.008	0.009	0.03845
2390.00	4.1841	1.484	0.020	0.008	0.009	0.03865
2400.00	4.1667	1.485	0.019	0.008	0.009	0.03885
2410.00	4.1494	1.487	0.018	0.008	0.009	0.03910
2420.00	4.1322	1.489	0.018	0.008	0.009	0.03930
2430.00	4.1152	1.490	0.017	0.008	0.009	0.03950
2440.00	4.0984	1.492	0.017	0.008	0.009	0.03965
2450.00	4.0816	1.493	0.017	0.008	0.009	0.03980
2460.00	4.0650	1.494	0.016	0.008	0.009	0.03995
2470.00	4.0486	1.495	0.015	0.008	0.009	0.04005
2480.00	4.0323	1.496	0.014	0.008	0.009	0.04020
2490.00	4.0161	1.498	0.013	0.008	0.009	0.04040
2500.00	4.0000	1.499	0.012	0.008	0.009	0.04065
2510.00	3.9841	1.501	0.011	0.008	0.009	0.04090
2520.00	3.9683	1.504	0.011	0.008	0.010	0.04120
2530.00	3.9526	1.506	0.011	0.008	0.010	0.04145
2540.00	3.9370	1.507	0.011	0.008	0.010	0.04165
2550.00	3.9216	1.508	0.011	0.008	0.010	0.04180
2560.00	3.9063	1.510	0.010	0.008	0.010	0.04200
2570.00	3.8911	1.511	0.009	0.008	0.009	0.04220
2580.00	3.8760	1.513	0.009	0.008	0.009	0.04245
2590.00	3.8610	1.516	0.008	0.008	0.008	0.04275
2600.00	3.8462	1.518	0.008	0.008	0.008	0.04305
2610.00	3.8314	1.520	0.008	0.008	0.008	0.04335
2620.00	3.8168	1.523	0.007	0.008	0.007	0.04370
2630.00	3.8023	1.526	0.008	0.008	0.008	0.04405
2640.00	3.7879	1.528	0.008	0.008	0.008	0.04440
2650.00	3.7736	1.531	0.009	0.008	0.009	0.04475
2660.00	3.7594	1.533	0.010	0.008	0.010	0.04510
2670.00	3.7453	1.536	0.012	0.008	0.010	0.04540

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 6

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.537	0.013	0.008	0.010	0.04565
2690.00	3.7175	1.540	0.015	0.008	0.010	0.04595
2700.00	3.7037	1.542	0.016	0.008	0.010	0.04625
2710.00	3.6900	1.544	0.018	0.008	0.011	0.04655
2720.00	3.6765	1.546	0.021	0.008	0.011	0.04685
2730.00	3.6630	1.548	0.024	0.008	0.011	0.04705
2740.00	3.6496	1.549	0.027	0.008	0.011	0.04725
2750.00	3.6364	1.549	0.030	0.008	0.011	0.04730
2760.00	3.6232	1.549	0.033	0.008	0.011	0.04730
2770.00	3.6101	1.548	0.036	0.008	0.011	0.04720
2780.00	3.5971	1.547	0.038	0.008	0.011	0.04705
2790.00	3.5842	1.545	0.040	0.008	0.011	0.04690
2800.00	3.5714	1.544	0.041	0.008	0.011	0.04680
2810.00	3.5587	1.543	0.042	0.008	0.011	0.04665
2820.00	3.5461	1.542	0.044	0.009	0.011	0.04650
2830.00	3.5336	1.541	0.045	0.009	0.011	0.04635
2840.00	3.5211	1.540	0.045	0.009	0.011	0.04625
2850.00	3.5088	1.539	0.046	0.009	0.011	0.04610
2860.00	3.4965	1.537	0.046	0.009	0.011	0.04595
2870.00	3.4843	1.536	0.047	0.009	0.011	0.04580
2880.00	3.4722	1.536	0.047	0.009	0.011	0.04570
2890.00	3.4602	1.535	0.047	0.009	0.011	0.04560
2900.00	3.4483	1.534	0.047	0.009	0.011	0.04550
2910.00	3.4364	1.534	0.047	0.009	0.011	0.04545
2920.00	3.4247	1.533	0.047	0.009	0.011	0.04540
2930.00	3.4130	1.533	0.047	0.009	0.011	0.04535
2940.00	3.4014	1.532	0.048	0.009	0.011	0.04530
2950.00	3.3898	1.532	0.048	0.009	0.011	0.04525
2960.00	3.3784	1.531	0.049	0.009	0.011	0.04515
2970.00	3.3670	1.530	0.049	0.009	0.011	0.04505
2980.00	3.3557	1.530	0.050	0.009	0.011	0.04495
2990.00	3.3445	1.528	0.050	0.009	0.011	0.04480
3000.00	3.3333	1.528	0.050	0.009	0.011	0.04470
3010.00	3.3223	1.527	0.050	0.009	0.011	0.04455
3020.00	3.3113	1.525	0.050	0.009	0.011	0.04440
3030.00	3.3003	1.524	0.050	0.009	0.011	0.04425
3040.00	3.2895	1.522	0.050	0.009	0.011	0.04400
3050.00	3.2787	1.521	0.049	0.009	0.011	0.04380
3060.00	3.2680	1.519	0.049	0.009	0.011	0.04360
3070.00	3.2573	1.518	0.048	0.009	0.011	0.04345
3080.00	3.2468	1.517	0.047	0.009	0.010	0.04325
3090.00	3.2362	1.516	0.046	0.009	0.010	0.04310
3100.00	3.2258	1.515	0.044	0.009	0.010	0.04300
3110.00	3.2154	1.514	0.043	0.009	0.010	0.04285
3120.00	3.2051	1.514	0.042	0.009	0.010	0.04280
3130.00	3.1949	1.513	0.040	0.009	0.010	0.04270
3140.00	3.1847	1.513	0.039	0.009	0.010	0.04265
3150.00	3.1746	1.513	0.038	0.009	0.010	0.04260
3160.00	3.1646	1.513	0.036	0.008	0.010	0.04255
3170.00	3.1546	1.512	0.035	0.008	0.010	0.04250

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 7

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.513	0.033	0.008	0.010	0.04250
3190.00	3.1348	1.513	0.032	0.008	0.010	0.04250
3200.00	3.1250	1.513	0.030	0.008	0.010	0.04255
3210.00	3.1153	1.514	0.029	0.008	0.010	0.04260
3220.00	3.1056	1.514	0.028	0.008	0.010	0.04265
3230.00	3.0960	1.514	0.028	0.008	0.010	0.04270
3240.00	3.0864	1.515	0.027	0.008	0.010	0.04275
3250.00	3.0769	1.515	0.026	0.008	0.010	0.04280
3260.00	3.0675	1.516	0.025	0.008	0.010	0.04285
3270.00	3.0581	1.516	0.025	0.008	0.010	0.04285
3280.00	3.0488	1.516	0.024	0.008	0.010	0.04285
3290.00	3.0395	1.516	0.023	0.008	0.010	0.04285
3300.00	3.0303	1.516	0.022	0.008	0.010	0.04290
3310.00	3.0211	1.517	0.021	0.008	0.010	0.04295
3320.00	3.0120	1.517	0.020	0.008	0.010	0.04300
3330.00	3.0030	1.518	0.019	0.008	0.010	0.04305
3340.00	2.9940	1.518	0.018	0.008	0.010	0.04310
3350.00	2.9851	1.519	0.017	0.008	0.010	0.04320
3360.00	2.9762	1.519	0.016	0.008	0.010	0.04325
3370.00	2.9674	1.520	0.015	0.008	0.010	0.04335
3380.00	2.9586	1.521	0.014	0.008	0.010	0.04345
3390.00	2.9499	1.522	0.014	0.008	0.010	0.04355
3400.00	2.9412	1.522	0.013	0.008	0.010	0.04365
3410.00	2.9326	1.523	0.013	0.008	0.010	0.04375
3420.00	2.9240	1.524	0.012	0.008	0.010	0.04385
3430.00	2.9155	1.525	0.012	0.008	0.010	0.04395
3440.00	2.9070	1.525	0.011	0.008	0.010	0.04405
3450.00	2.8986	1.526	0.011	0.008	0.010	0.04410
3460.00	2.8902	1.526	0.011	0.008	0.010	0.04415
3470.00	2.8818	1.527	0.011	0.008	0.010	0.04420
3480.00	2.8736	1.527	0.010	0.008	0.010	0.04425
3490.00	2.8653	1.527	0.010	0.008	0.010	0.04430
3500.00	2.8571	1.528	0.010	0.008	0.010	0.04435
3510.00	2.8490	1.528	0.009	0.008	0.009	0.04435
3520.00	2.8409	1.528	0.008	0.008	0.008	0.04440
3530.00	2.8329	1.529	0.008	0.008	0.008	0.04445
3540.00	2.8249	1.529	0.007	0.008	0.007	0.04455
3550.00	2.8169	1.530	0.006	0.008	0.006	0.04460
3560.00	2.8090	1.530	0.005	0.008	0.005	0.04465
3570.00	2.8011	1.531	0.004	0.008	0.004	0.04475
3580.00	2.7933	1.532	0.003	0.008	0.003	0.04485
3590.00	2.7855	1.532	0.003	0.008	0.003	0.04495
3600.00	2.7778	1.534	0.002	0.008	0.002	0.04510
3610.00	2.7701	1.534	0.001	0.008	0.001	0.04520
3620.00	2.7624	1.535	0.001	0.008	0.001	0.04535
3630.00	2.7548	1.537	0.000	0.008	0.000	0.04550
3640.00	2.7473	1.538	0.000	0.008	0.000	0.04565
3650.00	2.7397	1.539	0.000	0.008	0.001	0.04580
3660.00	2.7322	1.540	0.000	0.008	0.001	0.04595
3670.00	2.7248	1.541	0.000	0.008	0.001	0.04610

Table 16. Anhydrite E Parallel to Y-axis.

PAGE 8

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.542	0.000	0.008	0.002	0.04625
3690.00	2.7100	1.543	0.000	0.008	0.002	0.04640
3700.00	2.7027	1.545	0.000	0.008	0.002	0.04660
3710.00	2.6954	1.546	0.000	0.008	0.002	0.04675
3720.00	2.6882	1.547	0.000	0.008	0.002	0.04690
3730.00	2.6810	1.548	0.000	0.008	0.001	0.04705
3740.00	2.6738	1.549	0.000	0.008	0.001	0.04720
3750.00	2.6667	1.550	0.000	0.008	0.000	0.04725
3760.00	2.6596	1.550	0.000	0.008	0.000	0.04735
3770.00	2.6525	1.551	0.000	0.008	0.000	0.04745
3780.00	2.6455	1.551	0.001	0.008	0.001	0.04750
3790.00	2.6385	1.552	0.001	0.008	0.001	0.04760
3800.00	2.6316	1.553	0.002	0.008	0.002	0.04765
3810.00	2.6247	1.553	0.002	0.008	0.002	0.04775
3820.00	2.6178	1.554	0.002	0.008	0.002	0.04780
3830.00	2.6110	1.554	0.003	0.008	0.003	0.04785
3840.00	2.6042	1.554	0.004	0.008	0.004	0.04785
3850.00	2.5974	1.554	0.004	0.008	0.004	0.04785
3860.00	2.5907	1.554	0.004	0.008	0.004	0.04780
3870.00	2.5840	1.554	0.004	0.008	0.004	0.04780
3880.00	2.5773	1.554	0.004	0.008	0.004	0.04780
3890.00	2.5707	1.554	0.004	0.008	0.004	0.04780
3900.00	2.5641	1.554	0.004	0.008	0.004	0.04780
3910.00	2.5575	1.554	0.004	0.008	0.004	0.04780
3920.00	2.5510	1.554	0.004	0.008	0.004	0.04780
3930.00	2.5445	1.554	0.004	0.008	0.004	0.04780
3940.00	2.5381	1.554	0.004	0.008	0.004	0.04780
3950.00	2.5316	1.553	0.003	0.008	0.003	0.04775
3960.00	2.5253	1.553	0.003	0.008	0.003	0.04775
3970.00	2.5189	1.553	0.002	0.008	0.002	0.04770
3980.00	2.5126	1.553	0.002	0.008	0.002	0.04770
3990.00	2.5063	1.553	0.001	0.008	0.001	0.04765
4000.00	2.5000	1.553	0.000	0.008	0.000	0.04765

ANHYDRITE: Z-DIRECTION

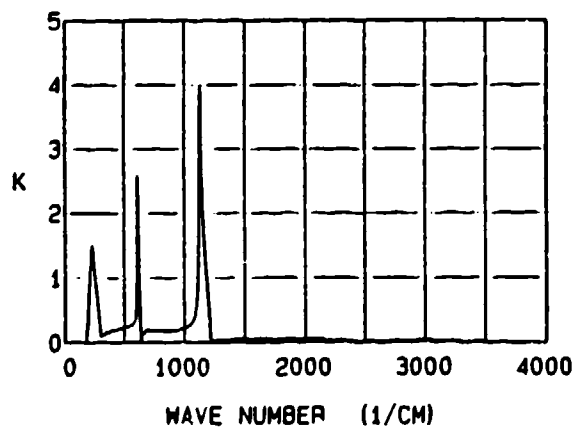
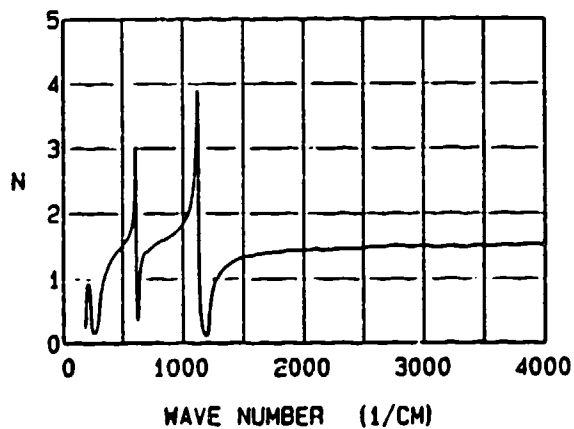
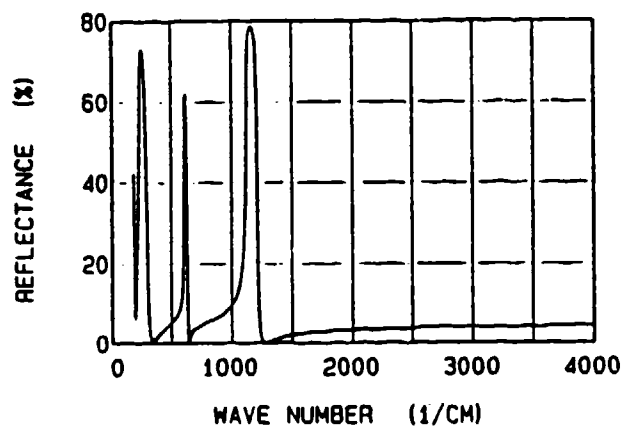


Figure 31. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of anhydrite, E/Z .

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	0.240	0.033	0.024	0.004	0.42110
190.00	52.6316	0.680	0.263	0.003	0.001	0.06140
200.00	50.0000	0.925	0.761	0.001	0.003	0.13885
210.00	47.6190	0.917	1.058	0.001	0.002	0.23750
220.00	45.4545	0.823	1.349	0.002	0.002	0.36285
230.00	43.4783	0.388	1.454	0.001	0.000	0.61900
240.00	41.6667	0.203	1.196	0.001	0.000	0.72045
250.00	40.0000	0.163	1.006	0.001	0.000	0.72730
260.00	38.4615	0.158	0.839	0.001	0.000	0.69505
270.00	37.0370	0.168	0.678	0.001	0.000	0.63800
280.00	35.7143	0.209	0.500	0.001	0.000	0.52035
290.00	34.4828	0.291	0.331	0.001	0.000	0.35775
300.00	33.3333	0.465	0.108	0.001	0.000	0.14590
310.00	32.2581	0.658	0.099	0.003	0.001	0.04780
320.00	31.2500	0.798	0.109	0.006	0.003	0.01685
330.00	30.3030	0.897	0.120	0.007	0.008	0.00710
340.00	29.4118	0.976	0.130	0.004	0.014	0.00460
350.00	28.5714	1.048	0.137	0.004	0.014	0.00510
360.00	27.7778	1.088	0.169	0.005	0.011	0.00845
370.00	27.0270	1.136	0.166	0.006	0.009	0.01025
380.00	26.3158	1.186	0.169	0.007	0.008	0.01340
390.00	25.6410	1.226	0.177	0.007	0.007	0.01685
400.00	25.0000	1.263	0.186	0.007	0.006	0.02050
410.00	24.3902	1.294	0.191	0.007	0.005	0.02365
420.00	23.8095	1.331	0.198	0.007	0.005	0.02770
430.00	23.2558	1.350	0.199	0.007	0.005	0.02970
440.00	22.7273	1.379	0.200	0.007	0.004	0.03285
450.00	22.2222	1.406	0.212	0.006	0.004	0.03665
460.00	21.7391	1.427	0.215	0.006	0.004	0.03925
470.00	21.2766	1.447	0.217	0.006	0.004	0.04170
480.00	20.8333	1.473	0.222	0.006	0.004	0.04500
490.00	20.4082	1.489	0.228	0.006	0.004	0.04735
500.00	20.0000	1.511	0.231	0.006	0.004	0.05025
510.00	19.6078	1.536	0.236	0.006	0.003	0.05375
520.00	19.2308	1.559	0.242	0.006	0.003	0.05705
530.00	18.8679	1.583	0.243	0.006	0.003	0.06025
540.00	18.5185	1.617	0.254	0.006	0.003	0.06540
550.00	18.1818	1.653	0.256	0.006	0.003	0.07035
560.00	17.8571	1.705	0.267	0.006	0.003	0.07800
570.00	17.5439	1.775	0.279	0.006	0.003	0.08845
580.00	17.2414	1.873	0.307	0.006	0.003	0.10400
590.00	16.9492	2.088	0.343	0.006	0.003	0.13650
600.00	16.6667	3.008	0.951	0.006	0.005	0.29315
610.00	16.3934	0.797	2.238	0.002	0.001	0.61520
620.00	16.1290	0.347	0.956	0.001	0.000	0.49535
630.00	15.8730	0.522	0.271	0.002	0.001	0.13140
640.00	15.6250	1.053	0.117	0.006	0.016	0.00400
650.00	15.3846	1.186	0.123	0.009	0.007	0.01060
660.00	15.1515	1.272	0.140	0.008	0.005	0.01840
670.00	14.9254	1.357	0.148	0.008	0.004	0.02735

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 2

WN	WL	N	K	DN	DK	R
680.00	14.7059	1.394	0.182	0.007	0.004	0.03325
690.00	14.4928	1.406	0.210	0.007	0.004	0.03645
700.00	14.2857	1.398	0.200	0.007	0.004	0.03490
710.00	14.0845	1.416	0.191	0.007	0.004	0.03635
720.00	13.8889	1.439	0.187	0.007	0.004	0.03875
730.00	13.6986	1.455	0.184	0.007	0.003	0.04045
740.00	13.5135	1.469	0.182	0.007	0.003	0.04200
750.00	13.3333	1.482	0.183	0.007	0.003	0.04365
760.00	13.1579	1.495	0.176	0.007	0.003	0.04490
770.00	12.9870	1.512	0.176	0.007	0.003	0.04695
780.00	12.8205	1.521	0.182	0.007	0.003	0.04845
790.00	12.6582	1.533	0.178	0.007	0.003	0.04985
800.00	12.5000	1.545	0.180	0.007	0.003	0.05145
810.00	12.3457	1.553	0.179	0.007	0.003	0.05245
820.00	12.1951	1.567	0.178	0.007	0.003	0.05415
830.00	12.0482	1.577	0.179	0.007	0.003	0.05550
840.00	11.9048	1.585	0.182	0.007	0.003	0.05675
850.00	11.7647	1.594	0.181	0.007	0.003	0.05790
860.00	11.6279	1.605	0.178	0.007	0.002	0.05920
870.00	11.4943	1.618	0.180	0.007	0.002	0.06110
880.00	11.3636	1.626	0.183	0.007	0.002	0.06240
890.00	11.2360	1.642	0.181	0.007	0.002	0.06440
900.00	11.1111	1.656	0.184	0.007	0.002	0.06645
910.00	10.9890	1.664	0.186	0.007	0.002	0.06770
920.00	10.8696	1.679	0.184	0.007	0.002	0.06970
930.00	10.7527	1.696	0.186	0.006	0.002	0.07210
940.00	10.6383	1.709	0.184	0.006	0.002	0.07385
950.00	10.5263	1.728	0.193	0.006	0.002	0.07700
960.00	10.4167	1.745	0.199	0.006	0.002	0.07970
970.00	10.3093	1.767	0.203	0.006	0.002	0.08295
980.00	10.2041	1.786	0.208	0.006	0.002	0.08600
990.00	10.1010	1.809	0.214	0.006	0.002	0.08945
1000.00	10.0000	1.836	0.221	0.006	0.002	0.09375
1010.00	9.9010	1.867	0.230	0.006	0.002	0.09855
1020.00	9.8039	1.897	0.239	0.006	0.002	0.10330
1030.00	9.7087	1.936	0.247	0.006	0.002	0.10935
1040.00	9.6154	1.982	0.261	0.006	0.002	0.11665
1050.00	9.5238	2.041	0.279	0.006	0.002	0.12605
1060.00	9.4340	2.106	0.297	0.006	0.002	0.13630
1070.00	9.3458	2.203	0.327	0.006	0.002	0.15170
1080.00	9.2593	2.321	0.371	0.006	0.003	0.17045
1090.00	9.1743	2.491	0.438	0.006	0.003	0.19700
1100.00	9.0909	2.764	0.572	0.007	0.003	0.23940
1110.00	9.0090	3.171	0.920	0.007	0.005	0.30700
1120.00	8.9286	3.898	1.864	0.006	0.009	0.43460
1130.00	8.8496	1.750	3.972	0.005	0.005	0.70180
1140.00	8.7719	0.607	2.735	0.003	0.001	0.76000
1150.00	8.6957	0.349	2.094	0.002	0.000	0.77640
1160.00	8.6207	0.238	1.678	0.001	0.000	0.78290
1170.00	8.5470	0.174	1.359	0.001	0.000	0.78650

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 3

WN	WL	N	K	DN	DK	R
1180.00	8.4746	0.142	1.092	0.001	0.000	0.77520
1190.00	8.4034	0.122	0.855	0.001	0.000	0.75755
1200.00	8.3333	0.116	0.599	0.000	0.000	0.71630
1210.00	8.2645	0.137	0.325	0.000	0.000	0.62545
1220.00	8.1967	0.406	0.052	0.001	0.000	0.19145
1230.00	8.1301	0.605	0.031	0.003	0.000	0.06350
1240.00	8.0645	0.733	0.015	0.005	0.000	0.02465
1250.00	8.0000	0.824	0.016	0.008	0.001	0.00965
1260.00	7.9365	0.900	0.020	0.016	0.003	0.00300
1270.00	7.8740	0.968	0.033	0.029	0.029	0.00055
1280.00	7.8125	0.996	0.046	0.005	0.042	0.00055
1290.00	7.7519	1.020	0.042	0.018	0.040	0.00055
1300.00	7.6923	1.050	0.024	0.034	0.017	0.00075
1310.00	7.6336	1.085	0.029	0.024	0.008	0.00190
1320.00	7.5758	1.114	0.030	0.019	0.005	0.00320
1330.00	7.5188	1.137	0.032	0.017	0.004	0.00445
1340.00	7.4627	1.158	0.034	0.015	0.004	0.00575
1350.00	7.4074	1.175	0.036	0.014	0.003	0.00690
1360.00	7.3529	1.192	0.037	0.013	0.003	0.00810
1370.00	7.2993	1.206	0.039	0.012	0.003	0.00920
1380.00	7.2464	1.218	0.039	0.012	0.002	0.01020
1390.00	7.1942	1.230	0.039	0.012	0.002	0.01120
1400.00	7.1429	1.243	0.039	0.011	0.002	0.01225
1410.00	7.0922	1.254	0.040	0.011	0.002	0.01325
1420.00	7.0423	1.262	0.041	0.011	0.002	0.01405
1430.00	6.9930	1.272	0.040	0.010	0.002	0.01490
1440.00	6.9444	1.281	0.040	0.010	0.002	0.01580
1450.00	6.8966	1.290	0.042	0.010	0.002	0.01665
1460.00	6.8493	1.296	0.043	0.010	0.002	0.01735
1470.00	6.8027	1.304	0.042	0.010	0.002	0.01810
1480.00	6.7568	1.311	0.043	0.010	0.002	0.01885
1490.00	6.7114	1.318	0.045	0.010	0.002	0.01955
1500.00	6.6667	1.323	0.046	0.009	0.002	0.02015
1510.00	6.6225	1.328	0.047	0.009	0.002	0.02065
1520.00	6.5789	1.333	0.047	0.009	0.002	0.02115
1530.00	6.5359	1.338	0.048	0.009	0.001	0.02170
1540.00	6.4935	1.342	0.048	0.009	0.001	0.02210
1550.00	6.4516	1.346	0.047	0.009	0.001	0.02255
1560.00	6.4103	1.350	0.047	0.009	0.001	0.02305
1570.00	6.3694	1.355	0.047	0.009	0.001	0.02360
1580.00	6.3291	1.359	0.048	0.009	0.001	0.02405
1590.00	6.2893	1.363	0.048	0.009	0.001	0.02450
1600.00	6.2500	1.368	0.050	0.009	0.001	0.02500
1610.00	6.2112	1.371	0.053	0.009	0.001	0.02540
1620.00	6.1728	1.371	0.054	0.009	0.001	0.02545
1630.00	6.1350	1.371	0.052	0.009	0.001	0.02545
1640.00	6.0976	1.374	0.049	0.009	0.001	0.02575
1650.00	6.0606	1.379	0.050	0.009	0.001	0.02625
1660.00	6.0241	1.380	0.050	0.009	0.001	0.02645
1670.00	5.9880	1.382	0.049	0.009	0.001	0.02665



Table 17. Anhydrite E Parallel to Z-axis.

PAGE 4

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.385	0.048	0.009	0.001	0.02700
1690.00	5.9172	1.388	0.049	0.009	0.001	0.02730
1700.00	5.8824	1.390	0.049	0.009	0.001	0.02750
1710.00	5.8480	1.392	0.048	0.009	0.001	0.02775
1720.00	5.8140	1.394	0.048	0.009	0.001	0.02795
1730.00	5.7803	1.396	0.048	0.009	0.001	0.02820
1740.00	5.7471	1.397	0.047	0.009	0.001	0.02835
1750.00	5.7143	1.400	0.046	0.008	0.001	0.02865
1760.00	5.6818	1.402	0.046	0.008	0.001	0.02890
1770.00	5.6497	1.404	0.046	0.008	0.001	0.02915
1780.00	5.6180	1.406	0.045	0.008	0.001	0.02935
1790.00	5.5866	1.409	0.045	0.008	0.001	0.02965
1800.00	5.5556	1.410	0.045	0.008	0.001	0.02985
1810.00	5.5249	1.412	0.044	0.008	0.001	0.03000
1820.00	5.4945	1.414	0.043	0.008	0.001	0.03025
1830.00	5.4645	1.416	0.043	0.008	0.001	0.03055
1840.00	5.4348	1.418	0.043	0.008	0.001	0.03075
1850.00	5.4054	1.420	0.043	0.008	0.001	0.03100
1860.00	5.3763	1.423	0.043	0.008	0.001	0.03130
1870.00	5.3476	1.425	0.044	0.008	0.001	0.03160
1880.00	5.3191	1.426	0.045	0.008	0.001	0.03170
1890.00	5.2910	1.426	0.046	0.008	0.001	0.03180
1900.00	5.2632	1.427	0.045	0.008	0.001	0.03185
1910.00	5.2356	1.428	0.045	0.008	0.001	0.03195
1920.00	5.2083	1.430	0.044	0.008	0.001	0.03215
1930.00	5.1813	1.433	0.043	0.008	0.001	0.03250
1940.00	5.1546	1.435	0.045	0.008	0.001	0.03280
1950.00	5.1282	1.435	0.046	0.008	0.001	0.03285
1960.00	5.1020	1.435	0.046	0.008	0.001	0.03290
1970.00	5.0761	1.436	0.047	0.008	0.001	0.03295
1980.00	5.0505	1.437	0.047	0.008	0.001	0.03305
1990.00	5.0251	1.437	0.047	0.008	0.001	0.03315
2000.00	5.0000	1.439	0.047	0.008	0.001	0.03330
2010.00	4.9751	1.439	0.048	0.008	0.001	0.03340
2020.00	4.9505	1.439	0.048	0.008	0.001	0.03335
2030.00	4.9261	1.439	0.046	0.008	0.001	0.03330
2040.00	4.9020	1.440	0.046	0.008	0.001	0.03350
2050.00	4.8780	1.441	0.046	0.008	0.001	0.03355
2060.00	4.8544	1.441	0.047	0.008	0.001	0.03355
2070.00	4.8309	1.441	0.046	0.008	0.001	0.03360
2080.00	4.8077	1.442	0.045	0.008	0.001	0.03370
2090.00	4.7847	1.444	0.045	0.008	0.001	0.03390
2100.00	4.7619	1.445	0.046	0.008	0.001	0.03410
2110.00	4.7393	1.447	0.048	0.008	0.001	0.03440
2120.00	4.7170	1.447	0.052	0.008	0.001	0.03435
2130.00	4.6948	1.441	0.054	0.008	0.001	0.03375
2140.00	4.6729	1.436	0.052	0.008	0.001	0.03300
2150.00	4.6512	1.434	0.045	0.008	0.001	0.03265
2160.00	4.6296	1.435	0.040	0.008	0.001	0.03280
2170.00	4.6083	1.439	0.038	0.008	0.001	0.03320

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 5

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.442	0.037	0.008	0.001	0.03355
2190.00	4.5662	1.443	0.037	0.008	0.001	0.03375
2200.00	4.5455	1.445	0.038	0.008	0.001	0.03390
2210.00	4.5249	1.445	0.037	0.008	0.001	0.03390
2220.00	4.5045	1.445	0.036	0.008	0.001	0.03395
2230.00	4.4843	1.446	0.036	0.008	0.001	0.03400
2240.00	4.4643	1.446	0.036	0.008	0.001	0.03400
2250.00	4.4444	1.445	0.034	0.008	0.001	0.03395
2260.00	4.4248	1.446	0.033	0.008	0.001	0.03405
2270.00	4.4053	1.448	0.032	0.008	0.001	0.03430
2280.00	4.3860	1.449	0.032	0.008	0.001	0.03435
2290.00	4.3668	1.449	0.031	0.008	0.001	0.03440
2300.00	4.3478	1.450	0.030	0.008	0.001	0.03445
2310.00	4.3290	1.450	0.029	0.008	0.001	0.03450
2320.00	4.3103	1.451	0.028	0.008	0.001	0.03455
2330.00	4.2918	1.452	0.027	0.008	0.001	0.03465
2340.00	4.2735	1.452	0.027	0.008	0.001	0.03470
2350.00	4.2553	1.453	0.026	0.008	0.001	0.03480
2360.00	4.2373	1.454	0.025	0.008	0.001	0.03490
2370.00	4.2194	1.455	0.024	0.008	0.001	0.03500
2380.00	4.2017	1.455	0.023	0.008	0.000	0.03510
2390.00	4.1841	1.456	0.022	0.008	0.000	0.03515
2400.00	4.1667	1.457	0.021	0.008	0.000	0.03530
2410.00	4.1494	1.458	0.020	0.008	0.000	0.03540
2420.00	4.1322	1.459	0.019	0.008	0.000	0.03555
2430.00	4.1152	1.460	0.018	0.008	0.000	0.03565
2440.00	4.0984	1.461	0.017	0.008	0.000	0.03580
2450.00	4.0816	1.463	0.016	0.008	0.000	0.03600
2460.00	4.0650	1.464	0.016	0.008	0.000	0.03615
2470.00	4.0486	1.465	0.015	0.008	0.000	0.03625
2480.00	4.0323	1.466	0.014	0.008	0.000	0.03640
2490.00	4.0161	1.468	0.013	0.008	0.000	0.03660
2500.00	4.0000	1.469	0.012	0.008	0.000	0.03680
2510.00	3.9841	1.471	0.012	0.008	0.000	0.03705
2520.00	3.9683	1.473	0.012	0.008	0.000	0.03730
2530.00	3.9526	1.475	0.012	0.008	0.000	0.03745
2540.00	3.9370	1.476	0.012	0.008	0.000	0.03760
2550.00	3.9216	1.477	0.012	0.008	0.000	0.03775
2560.00	3.9063	1.478	0.011	0.008	0.000	0.03790
2570.00	3.8911	1.479	0.011	0.008	0.000	0.03805
2580.00	3.8760	1.481	0.011	0.008	0.000	0.03820
2590.00	3.8610	1.482	0.010	0.008	0.000	0.03840
2600.00	3.8462	1.484	0.010	0.008	0.000	0.03865
2610.00	3.8314	1.486	0.010	0.008	0.000	0.03885
2620.00	3.8168	1.488	0.010	0.008	0.000	0.03910
2630.00	3.8023	1.489	0.010	0.008	0.000	0.03935
2640.00	3.7879	1.491	0.011	0.008	0.000	0.03955
2650.00	3.7736	1.493	0.011	0.008	0.000	0.03980
2660.00	3.7594	1.494	0.012	0.008	0.000	0.04000
2670.00	3.7453	1.496	0.013	0.008	0.000	0.04015

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 6

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.497	0.013	0.008	0.000	0.04035
2690.00	3.7175	1.498	0.014	0.008	0.000	0.04050
2700.00	3.7037	1.500	0.015	0.008	0.000	0.04070
2710.00	3.6900	1.501	0.016	0.008	0.000	0.04090
2720.00	3.6765	1.502	0.017	0.008	0.000	0.04105
2730.00	3.6630	1.504	0.019	0.008	0.000	0.04125
2740.00	3.6496	1.505	0.021	0.008	0.000	0.04140
2750.00	3.6364	1.505	0.023	0.008	0.000	0.04145
2760.00	3.6232	1.505	0.025	0.008	0.000	0.04145
2770.00	3.6101	1.505	0.027	0.008	0.000	0.04140
2780.00	3.5971	1.504	0.027	0.008	0.001	0.04130
2790.00	3.5842	1.503	0.028	0.008	0.001	0.04125
2800.00	3.5714	1.503	0.029	0.008	0.001	0.04120
2810.00	3.5587	1.502	0.030	0.008	0.001	0.04115
2820.00	3.5461	1.502	0.030	0.008	0.001	0.04110
2830.00	3.5336	1.502	0.031	0.008	0.001	0.04105
2840.00	3.5211	1.502	0.032	0.008	0.001	0.04105
2850.00	3.5088	1.501	0.032	0.008	0.001	0.04100
2860.00	3.4965	1.501	0.032	0.008	0.001	0.04095
2870.00	3.4843	1.500	0.033	0.008	0.001	0.04085
2880.00	3.4722	1.500	0.033	0.008	0.001	0.04080
2890.00	3.4602	1.499	0.033	0.008	0.001	0.04075
2900.00	3.4483	1.499	0.033	0.008	0.001	0.04070
2910.00	3.4364	1.498	0.032	0.008	0.001	0.04065
2920.00	3.4247	1.498	0.032	0.008	0.001	0.04065
2930.00	3.4130	1.498	0.032	0.008	0.001	0.04065
2940.00	3.4014	1.498	0.032	0.008	0.001	0.04065
2950.00	3.3898	1.498	0.032	0.008	0.001	0.04065
2960.00	3.3784	1.498	0.033	0.008	0.001	0.04065
2970.00	3.3670	1.498	0.033	0.008	0.001	0.04065
2980.00	3.3557	1.498	0.033	0.008	0.001	0.04065
2990.00	3.3445	1.498	0.033	0.008	0.001	0.04060
3000.00	3.3333	1.498	0.033	0.008	0.001	0.04060
3010.00	3.3223	1.498	0.034	0.008	0.001	0.04060
3020.00	3.3113	1.498	0.034	0.008	0.001	0.04060
3030.00	3.3003	1.497	0.035	0.008	0.001	0.04055
3040.00	3.2895	1.497	0.035	0.008	0.001	0.04045
3050.00	3.2787	1.496	0.036	0.008	0.001	0.04035
3060.00	3.2680	1.495	0.036	0.008	0.001	0.04025
3070.00	3.2573	1.494	0.036	0.008	0.001	0.04010
3080.00	3.2468	1.493	0.035	0.008	0.001	0.04000
3090.00	3.2362	1.492	0.035	0.008	0.001	0.03985
3100.00	3.2258	1.491	0.034	0.008	0.001	0.03970
3110.00	3.2154	1.490	0.033	0.008	0.001	0.03960
3120.00	3.2051	1.490	0.033	0.008	0.001	0.03955
3130.00	3.1949	1.489	0.032	0.008	0.001	0.03945
3140.00	3.1847	1.489	0.031	0.008	0.001	0.03940
3150.00	3.1746	1.488	0.030	0.008	0.001	0.03930
3160.00	3.1646	1.488	0.029	0.008	0.001	0.03925
3170.00	3.1546	1.487	0.028	0.008	0.001	0.03920

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 7

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.487	0.027	0.008	0.001	0.03915
3190.00	3.1348	1.487	0.026	0.008	0.001	0.03910
3200.00	3.1250	1.487	0.024	0.008	0.000	0.03915
3210.00	3.1153	1.487	0.024	0.008	0.000	0.03915
3220.00	3.1056	1.488	0.022	0.008	0.000	0.03920
3230.00	3.0960	1.488	0.022	0.008	0.000	0.03925
3240.00	3.0864	1.489	0.021	0.008	0.000	0.03935
3250.00	3.0769	1.489	0.020	0.008	0.000	0.03940
3260.00	3.0675	1.490	0.020	0.008	0.000	0.03945
3270.00	3.0581	1.490	0.020	0.008	0.000	0.03945
3280.00	3.0488	1.490	0.019	0.008	0.000	0.03945
3290.00	3.0395	1.490	0.018	0.008	0.000	0.03945
3300.00	3.0303	1.490	0.017	0.008	0.000	0.03945
3310.00	3.0211	1.490	0.016	0.008	0.000	0.03950
3320.00	3.0120	1.491	0.016	0.008	0.000	0.03955
3330.00	3.0030	1.492	0.014	0.008	0.000	0.03965
3340.00	2.9940	1.492	0.014	0.008	0.000	0.03975
3350.00	2.9851	1.493	0.013	0.008	0.000	0.03985
3360.00	2.9762	1.494	0.013	0.008	0.000	0.03990
3370.00	2.9674	1.494	0.012	0.008	0.000	0.04000
3380.00	2.9586	1.495	0.012	0.008	0.000	0.04005
3390.00	2.9499	1.496	0.012	0.008	0.000	0.04015
3400.00	2.9412	1.496	0.012	0.008	0.000	0.04020
3410.00	2.9326	1.496	0.011	0.008	0.000	0.04025
3420.00	2.9240	1.497	0.011	0.008	0.000	0.04030
3430.00	2.9155	1.497	0.011	0.008	0.000	0.04035
3440.00	2.9070	1.498	0.011	0.008	0.000	0.04040
3450.00	2.8986	1.498	0.010	0.008	0.000	0.04045
3460.00	2.8902	1.498	0.010	0.008	0.000	0.04050
3470.00	2.8818	1.499	0.010	0.008	0.000	0.04055
3480.00	2.8736	1.499	0.010	0.008	0.000	0.04055
3490.00	2.8653	1.499	0.009	0.008	0.000	0.04060
3500.00	2.8571	1.499	0.009	0.008	0.000	0.04060
3510.00	2.8490	1.499	0.009	0.008	0.000	0.04060
3520.00	2.8409	1.499	0.009	0.008	0.000	0.04060
3530.00	2.8329	1.499	0.008	0.008	0.000	0.04060
3540.00	2.8249	1.499	0.007	0.008	0.000	0.04060
3550.00	2.8169	1.499	0.006	0.008	0.000	0.04060
3560.00	2.8090	1.500	0.006	0.008	0.000	0.04065
3570.00	2.8011	1.500	0.005	0.008	0.000	0.04070
3580.00	2.7933	1.500	0.004	0.008	0.000	0.04075
3590.00	2.7855	1.501	0.003	0.008	0.000	0.04080
3600.00	2.7778	1.502	0.002	0.008	0.000	0.04090
3610.00	2.7701	1.502	0.001	0.008	0.000	0.04100
3620.00	2.7624	1.503	0.000	0.008	0.000	0.04110
3630.00	2.7548	1.504	0.000	0.008	0.001	0.04125
3640.00	2.7473	1.505	0.000	0.008	0.001	0.04140
3650.00	2.7397	1.507	0.000	0.008	0.002	0.04155
3660.00	2.7322	1.508	0.000	0.008	0.002	0.04170
3670.00	2.7248	1.509	0.000	0.008	0.003	0.04190

Table 17. Anhydrite E Parallel to Z-axis.

PAGE 8

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.510	0.000	0.008	0.003	0.04205
3690.00	2.7100	1.512	0.000	0.008	0.003	0.04220
3700.00	2.7027	1.513	0.000	0.008	0.003	0.04235
3710.00	2.6954	1.514	0.000	0.008	0.003	0.04250
3720.00	2.6882	1.515	0.000	0.008	0.002	0.04265
3730.00	2.6810	1.516	0.000	0.008	0.002	0.04275
3740.00	2.6738	1.517	0.000	0.008	0.002	0.04285
3750.00	2.6667	1.517	0.000	0.008	0.001	0.04295
3760.00	2.6596	1.518	0.000	0.008	0.001	0.04300
3770.00	2.6525	1.518	0.000	0.008	0.001	0.04310
3780.00	2.6455	1.519	0.000	0.008	0.000	0.04315
3790.00	2.6385	1.519	0.000	0.008	0.000	0.04320
3800.00	2.6316	1.520	0.001	0.008	0.000	0.04325
3810.00	2.6247	1.520	0.001	0.008	0.000	0.04330
3820.00	2.6178	1.520	0.001	0.008	0.000	0.04335
3830.00	2.6110	1.520	0.001	0.008	0.000	0.04335
3840.00	2.6042	1.521	0.001	0.008	0.000	0.04340
3850.00	2.5974	1.521	0.002	0.008	0.000	0.04340
3860.00	2.5907	1.521	0.002	0.008	0.000	0.04345
3870.00	2.5840	1.521	0.002	0.008	0.000	0.04345
3880.00	2.5773	1.521	0.002	0.008	0.000	0.04345
3890.00	2.5707	1.521	0.002	0.008	0.000	0.04350
3900.00	2.5641	1.521	0.002	0.008	0.000	0.04350
3910.00	2.5575	1.521	0.002	0.008	0.000	0.04350
3920.00	2.5510	1.521	0.002	0.008	0.000	0.04345
3930.00	2.5445	1.521	0.002	0.008	0.000	0.04345
3940.00	2.5381	1.521	0.001	0.008	0.000	0.04345
3950.00	2.5316	1.521	0.001	0.008	0.000	0.04345
3960.00	2.5253	1.521	0.001	0.008	0.000	0.04345
3970.00	2.5189	1.521	0.000	0.008	0.000	0.04345
3980.00	2.5126	1.521	0.000	0.008	0.000	0.04345
3990.00	2.5063	1.521	0.000	0.008	0.001	0.04340
4000.00	2.5000	1.521	0.000	0.008	0.002	0.04340

#### 4.15 Dolomite [CaMg(CO<sub>3</sub>)<sub>2</sub>].

Dolomite is an optically uniaxial crystal of the  $R\bar{3}$  space group. The optical directions are parallel (E-ray) and perpendicular (O-ray) to the c-axis of the crystal. A crystalline sample acquired from Ward's Natural Science Establishment was cut parallel to the c-axis and polished. The infrared reflectance spectra were then measured for plane polarized radiant flux incident on the sample with the electric vector parallel (E-ray) and perpendicular (O-ray) to the c-axis. The optical constants were obtained from Kramers-Kronig analysis of the reflectance spectra.

The resultant spectra are presented in Figures 32 and 33 and in Tables 18 and 19.

The same problems were encountered with acquisition of the nir-vis-uv spectra for dolomite as those noted in Section 4.14 for anhydrite.

# DOLOMITE E-RAY

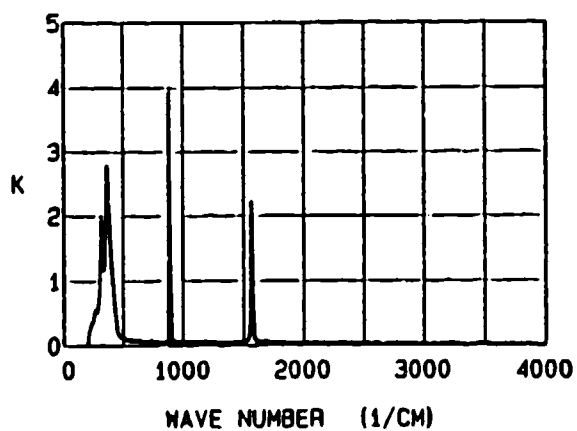
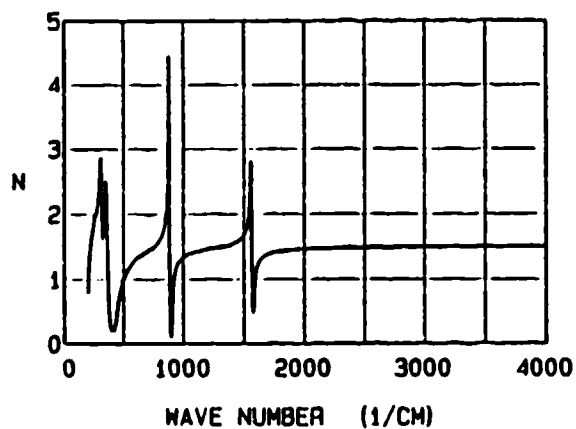
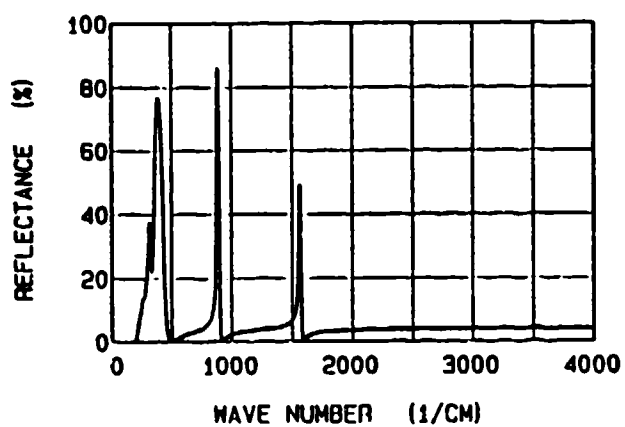


Figure 32. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of dolomite, E/C.

Table 18. Dolomite E Perpendicular to C-axis PAGE 1

WN	WL	N	K	DN	DK	R
250.00	40.0000	3.906	0.000	0.037	0.164	0.35395
260.00	38.4615	3.382	2.324	0.061	0.027	0.45250
270.00	37.0370	1.869	1.262	0.018	0.008	0.24120
280.00	35.7143	2.021	0.451	0.012	0.014	0.13520
290.00	34.4828	2.424	0.212	0.011	0.019	0.17800
300.00	33.3333	2.739	0.149	0.011	0.025	0.21955
310.00	32.2581	3.102	0.168	0.012	0.033	0.26605
320.00	31.2500	3.552	0.270	0.016	0.044	0.31905
330.00	30.3030	4.294	0.621	0.031	0.067	0.39780
340.00	29.4118	5.102	1.998	0.086	0.088	0.50720
350.00	28.5714	3.856	4.448	0.129	0.035	0.64615
360.00	27.7778	1.597	3.997	0.052	0.058	0.72035
370.00	27.0270	0.879	3.157	0.024	0.040	0.74100
380.00	26.3158	0.539	2.559	0.013	0.028	0.75980
390.00	25.6410	0.367	2.069	0.007	0.020	0.76300
400.00	25.0000	0.291	1.668	0.005	0.014	0.74055
410.00	24.3902	0.264	1.331	0.004	0.010	0.68940
420.00	23.8095	0.269	1.023	0.003	0.008	0.59835
430.00	23.2558	0.319	0.736	0.003	0.006	0.44595
440.00	22.7273	0.431	0.474	0.003	0.004	0.24760
450.00	22.2222	0.604	0.282	0.003	0.004	0.09245
460.00	21.7391	0.780	0.182	0.005	0.004	0.02625
470.00	21.2766	0.913	0.141	0.007	0.009	0.00765
480.00	20.8333	1.023	0.111	0.003	0.018	0.00320
490.00	20.4082	1.105	0.107	0.011	0.012	0.00515
500.00	20.0000	1.160	0.102	0.012	0.009	0.00790
510.00	19.6078	1.203	0.086	0.012	0.007	0.01025
520.00	19.2308	1.249	0.069	0.011	0.005	0.01345
530.00	18.8679	1.292	0.059	0.010	0.005	0.01725
540.00	18.5185	1.325	0.049	0.010	0.004	0.02040
550.00	18.1818	1.361	0.042	0.009	0.004	0.02415
560.00	17.8571	1.392	0.033	0.009	0.004	0.02750
570.00	17.5439	1.422	0.028	0.009	0.004	0.03100
580.00	17.2414	1.449	0.024	0.008	0.005	0.03425
590.00	16.9492	1.472	0.023	0.008	0.005	0.03715
600.00	16.6667	1.499	0.018	0.008	0.005	0.04065
610.00	16.3934	1.514	0.021	0.008	0.005	0.04265
620.00	16.1290	1.534	0.018	0.008	0.005	0.04515
630.00	15.8730	1.557	0.016	0.008	0.006	0.04825
640.00	15.6250	1.570	0.019	0.008	0.006	0.05005
650.00	15.3846	1.582	0.019	0.008	0.006	0.05175
660.00	15.1515	1.599	0.016	0.008	0.006	0.05405
670.00	14.9254	1.612	0.012	0.007	0.006	0.05580
680.00	14.7059	1.634	0.011	0.007	0.006	0.05890
690.00	14.4928	1.652	0.012	0.007	0.007	0.06140
700.00	14.2857	1.679	0.008	0.007	0.007	0.06520
710.00	14.0845	1.719	0.008	0.007	0.007	0.07095
720.00	13.8889	1.847	0.029	0.007	0.009	0.08990
730.00	13.6986	1.686	0.426	0.010	0.010	0.08945
740.00	13.5135	1.452	0.100	0.009	0.006	0.03620



Table 18. Dolomite E Perpendicular to C-axis PAGE 2

WN	WL	N	K	DN	DK	R
750.00	13.3333	1.570	0.026	0.008	0.006	0.05015
760.00	13.1579	1.611	0.017	0.007	0.006	0.05575
770.00	12.9870	1.634	0.011	0.007	0.006	0.05890
780.00	12.8205	1.653	0.011	0.007	0.007	0.06160
790.00	12.6582	1.668	0.010	0.007	0.007	0.06370
800.00	12.5000	1.678	0.009	0.007	0.007	0.06515
810.00	12.3457	1.689	0.008	0.007	0.007	0.06660
820.00	12.1951	1.696	0.004	0.007	0.004	0.06770
830.00	12.0482	1.710	0.005	0.007	0.005	0.06975
840.00	11.9048	1.718	0.004	0.007	0.004	0.07085
850.00	11.7647	1.726	0.004	0.007	0.004	0.07205
860.00	11.6279	1.735	0.004	0.007	0.004	0.07335
870.00	11.4943	1.747	0.004	0.007	0.004	0.07500
880.00	11.3636	1.754	0.009	0.007	0.008	0.07605
890.00	11.2360	1.758	0.008	0.007	0.008	0.07665
900.00	11.1111	1.762	0.007	0.007	0.007	0.07730
910.00	10.9890	1.772	0.005	0.007	0.005	0.07870
920.00	10.8696	1.778	0.005	0.007	0.005	0.07965
930.00	10.7527	1.789	0.005	0.007	0.005	0.08115
940.00	10.6383	1.795	0.007	0.007	0.007	0.08205
950.00	10.5263	1.801	0.005	0.007	0.005	0.08300
960.00	10.4167	1.809	0.005	0.007	0.005	0.08410
970.00	10.3093	1.817	0.004	0.007	0.004	0.08535
980.00	10.2041	1.825	0.006	0.007	0.006	0.08655
990.00	10.1010	1.832	0.005	0.007	0.005	0.08750
1000.00	10.0000	1.842	0.004	0.007	0.004	0.08895
1010.00	9.9010	1.849	0.005	0.007	0.005	0.09000
1020.00	9.8039	1.859	0.007	0.007	0.007	0.09160
1030.00	9.7087	1.865	0.008	0.007	0.008	0.09240
1040.00	9.6154	1.874	0.006	0.007	0.006	0.09370
1050.00	9.5238	1.884	0.008	0.007	0.008	0.09520
1060.00	9.4340	1.892	0.007	0.007	0.007	0.09650
1070.00	9.3458	1.902	0.008	0.007	0.008	0.09790
1080.00	9.2593	1.913	0.009	0.007	0.009	0.09955
1090.00	9.1743	1.921	0.010	0.007	0.010	0.10080
1100.00	9.0909	1.932	0.010	0.007	0.010	0.10240
1110.00	9.0090	1.943	0.012	0.007	0.010	0.10400
1120.00	8.9286	1.952	0.011	0.007	0.011	0.10545
1130.00	8.8496	1.964	0.011	0.007	0.011	0.10715
1140.00	8.7719	1.978	0.011	0.007	0.011	0.10925
1150.00	8.6957	1.991	0.011	0.007	0.011	0.11115
1160.00	8.6207	2.005	0.012	0.007	0.011	0.11335
1170.00	8.5470	2.021	0.010	0.007	0.010	0.11565
1180.00	8.4746	2.038	0.014	0.007	0.012	0.11825
1190.00	8.4034	2.054	0.016	0.007	0.012	0.12060
1200.00	8.3333	2.068	0.016	0.007	0.012	0.12275
1210.00	8.2645	2.091	0.013	0.007	0.013	0.12610
1220.00	8.1967	2.112	0.015	0.007	0.013	0.12925
1230.00	8.1301	2.134	0.018	0.007	0.013	0.13260
1240.00	8.0645	2.156	0.016	0.007	0.014	0.13585

Table 18. Dolomite E Perpendicular to C-axis PAGE 3

WN	WL	N	K	DN	DK	R
1250.00	8.0000	2.185	0.015	0.007	0.014	0.14015
1260.00	7.9365	2.214	0.017	0.007	0.015	0.14430
1270.00	7.8740	2.249	0.012	0.007	0.012	0.14950
1280.00	7.8125	2.290	0.014	0.007	0.014	0.15550
1290.00	7.7519	2.333	0.015	0.007	0.015	0.16175
1300.00	7.6923	2.382	0.017	0.007	0.017	0.16880
1310.00	7.6336	2.437	0.018	0.007	0.018	0.17665
1320.00	7.5758	2.503	0.017	0.008	0.017	0.18595
1330.00	7.5188	2.583	0.017	0.008	0.017	0.19710
1340.00	7.4627	2.676	0.024	0.008	0.023	0.20995
1350.00	7.4074	2.790	0.024	0.008	0.024	0.22510
1360.00	7.3529	2.942	0.029	0.009	0.029	0.24490
1370.00	7.2993	3.141	0.054	0.010	0.033	0.26960
1380.00	7.2464	3.392	0.095	0.011	0.039	0.29920
1390.00	7.1942	3.771	0.150	0.014	0.050	0.34030
1400.00	7.1429	4.431	0.351	0.023	0.071	0.40395
1410.00	7.0922	5.350	1.022	0.054	0.104	0.48490
1420.00	7.0423	6.584	3.793	0.196	0.124	0.63560
1430.00	6.9930	2.657	5.709	0.121	0.108	0.77010
1440.00	6.9444	1.181	4.250	0.043	0.069	0.79430
1450.00	6.8966	0.774	3.492	0.024	0.048	0.79945
1460.00	6.8493	0.490	2.979	0.014	0.037	0.82450
1470.00	6.8027	0.326	2.546	0.008	0.028	0.84280
1480.00	6.7568	0.241	2.202	0.006	0.022	0.85015
1490.00	6.7114	0.187	1.925	0.004	0.018	0.85500
1500.00	6.6667	0.147	1.689	0.003	0.014	0.85970
1510.00	6.6225	0.120	1.478	0.002	0.012	0.86185
1520.00	6.5789	0.102	1.286	0.002	0.010	0.85970
1530.00	6.5359	0.089	1.107	0.001	0.008	0.85415
1540.00	6.4935	0.080	0.931	0.001	0.007	0.84535
1550.00	6.4516	0.077	0.750	0.001	0.006	0.82340
1560.00	6.4103	0.086	0.551	0.001	0.005	0.77430
1570.00	6.3694	0.144	0.296	0.001	0.004	0.60610
1580.00	6.3291	0.373	0.105	0.001	0.003	0.22730
1590.00	6.2893	0.554	0.089	0.002	0.003	0.08950
1600.00	6.2500	0.660	0.083	0.004	0.003	0.04615
1610.00	6.2112	0.738	0.072	0.005	0.003	0.02525
1620.00	6.1728	0.807	0.060	0.007	0.003	0.01285
1630.00	6.1350	0.867	0.054	0.011	0.005	0.00610
1640.00	6.0976	0.921	0.051	0.016	0.010	0.00245
1650.00	6.0606	0.960	0.050	0.019	0.022	0.00110
1660.00	6.0241	0.998	0.050	0.003	0.039	0.00065
1670.00	5.9880	1.024	0.038	0.024	0.038	0.00050
1680.00	5.9524	1.061	0.038	0.025	0.017	0.00125
1690.00	5.9172	1.090	0.033	0.022	0.009	0.00215
1700.00	5.8824	1.117	0.034	0.019	0.007	0.00340
1710.00	5.8480	1.140	0.038	0.016	0.006	0.00470
1720.00	5.8140	1.156	0.032	0.016	0.005	0.00555
1730.00	5.7803	1.177	0.032	0.014	0.004	0.00700
1740.00	5.7471	1.196	0.031	0.013	0.004	0.00835

Table 18. Dolomite E Perpendicular to C-axis PAGE 4

WN	WL	N	K	DN	DK	R
1750.00	5.7143	1.213	0.032	0.013	0.004	0.00970
1760.00	5.6818	1.231	0.030	0.012	0.004	0.01110
1770.00	5.6497	1.245	0.033	0.012	0.004	0.01235
1780.00	5.6180	1.262	0.034	0.011	0.004	0.01395
1790.00	5.5866	1.273	0.040	0.011	0.004	0.01500
1800.00	5.5556	1.286	0.044	0.011	0.004	0.01630
1810.00	5.5249	1.290	0.057	0.010	0.005	0.01695
1820.00	5.4945	1.279	0.059	0.011	0.005	0.01600
1830.00	5.4645	1.275	0.042	0.011	0.004	0.01525
1840.00	5.4348	1.291	0.027	0.010	0.004	0.01660
1850.00	5.4054	1.306	0.025	0.010	0.004	0.01805
1860.00	5.3763	1.316	0.021	0.010	0.003	0.01925
1870.00	5.3476	1.328	0.022	0.010	0.004	0.02035
1880.00	5.3191	1.336	0.024	0.010	0.004	0.02125
1890.00	5.2910	1.344	0.022	0.009	0.004	0.02205
1900.00	5.2632	1.351	0.023	0.009	0.004	0.02280
1910.00	5.2356	1.359	0.019	0.009	0.004	0.02365
1920.00	5.2083	1.365	0.022	0.009	0.004	0.02440
1930.00	5.1813	1.372	0.022	0.009	0.004	0.02520
1940.00	5.1546	1.375	0.022	0.009	0.004	0.02550
1950.00	5.1282	1.384	0.020	0.009	0.004	0.02645
1960.00	5.1020	1.389	0.022	0.009	0.004	0.02705
1970.00	5.0761	1.391	0.022	0.009	0.004	0.02735
1980.00	5.0505	1.397	0.019	0.009	0.004	0.02795
1990.00	5.0251	1.403	0.019	0.009	0.004	0.02870
2000.00	5.0000	1.409	0.021	0.009	0.004	0.02940
2010.00	4.9751	1.412	0.020	0.009	0.004	0.02975
2020.00	4.9505	1.416	0.020	0.009	0.004	0.03020
2030.00	4.9261	1.421	0.019	0.009	0.004	0.03090
2040.00	4.9020	1.424	0.022	0.009	0.004	0.03120
2050.00	4.8780	1.426	0.020	0.009	0.004	0.03145
2060.00	4.8544	1.432	0.018	0.008	0.004	0.03215
2070.00	4.8309	1.436	0.020	0.008	0.004	0.03265
2080.00	4.8077	1.437	0.021	0.008	0.004	0.03285
2090.00	4.7847	1.442	0.018	0.008	0.004	0.03335
2100.00	4.7619	1.445	0.021	0.008	0.004	0.03385
2110.00	4.7393	1.447	0.019	0.008	0.004	0.03405
2120.00	4.7170	1.452	0.020	0.008	0.005	0.03460
2130.00	4.6948	1.454	0.020	0.008	0.005	0.03495
2140.00	4.6729	1.456	0.021	0.008	0.005	0.03520
2150.00	4.6512	1.458	0.019	0.008	0.005	0.03535
2160.00	4.6296	1.463	0.021	0.008	0.005	0.03600
2170.00	4.6083	1.463	0.021	0.008	0.005	0.03605
2180.00	4.5872	1.466	0.020	0.008	0.005	0.03645
2190.00	4.5662	1.468	0.020	0.008	0.005	0.03660
2200.00	4.5455	1.471	0.019	0.008	0.005	0.03700
2210.00	4.5249	1.473	0.020	0.008	0.005	0.03730
2220.00	4.5045	1.475	0.018	0.008	0.005	0.03750
2230.00	4.4843	1.478	0.020	0.008	0.005	0.03795
2240.00	4.4643	1.480	0.019	0.008	0.005	0.03815

Table 18. Dolomite E Perpendicular to C-axis PAGE 5

WN	WL	N	K	DN	DK	R
2250.00	4.4444	1.482	0.020	0.008	0.005	0.03845
2260.00	4.4248	1.484	0.019	0.008	0.005	0.03870
2270.00	4.4053	1.484	0.019	0.008	0.005	0.03870
2280.00	4.3860	1.487	0.019	0.008	0.005	0.03910
2290.00	4.3668	1.490	0.018	0.008	0.005	0.03950
2300.00	4.3478	1.493	0.017	0.008	0.005	0.03980
2310.00	4.3290	1.495	0.021	0.008	0.005	0.04015
2320.00	4.3103	1.495	0.021	0.008	0.005	0.04005
2330.00	4.2918	1.496	0.019	0.008	0.005	0.04020
2340.00	4.2735	1.500	0.020	0.008	0.005	0.04075
2350.00	4.2553	1.498	0.020	0.008	0.005	0.04050
2360.00	4.2373	1.502	0.018	0.008	0.005	0.04105
2370.00	4.2194	1.501	0.018	0.008	0.005	0.04085
2380.00	4.2017	1.507	0.018	0.008	0.005	0.04160
2390.00	4.1841	1.507	0.019	0.008	0.005	0.04160
2400.00	4.1667	1.510	0.019	0.008	0.005	0.04205
2410.00	4.1494	1.509	0.019	0.008	0.005	0.04195
2420.00	4.1322	1.511	0.018	0.008	0.005	0.04215
2430.00	4.1152	1.515	0.017	0.008	0.005	0.04265
2440.00	4.0984	1.516	0.019	0.008	0.005	0.04280
2450.00	4.0816	1.517	0.018	0.008	0.005	0.04290
2460.00	4.0650	1.522	0.019	0.008	0.005	0.04360
2470.00	4.0486	1.523	0.021	0.008	0.005	0.04375
2480.00	4.0323	1.523	0.021	0.008	0.005	0.04380
2490.00	4.0161	1.529	0.022	0.008	0.005	0.04455
2500.00	4.0000	1.530	0.025	0.008	0.005	0.04475
2510.00	3.9841	1.534	0.029	0.008	0.005	0.04530
2520.00	3.9683	1.532	0.040	0.008	0.006	0.04520
2530.00	3.9526	1.523	0.041	0.008	0.006	0.04400
2540.00	3.9370	1.519	0.041	0.008	0.006	0.04345
2550.00	3.9216	1.515	0.035	0.008	0.005	0.04280
2560.00	3.9063	1.512	0.033	0.008	0.005	0.04245
2570.00	3.8911	1.515	0.025	0.008	0.005	0.04280
2580.00	3.8760	1.517	0.028	0.008	0.005	0.04305
2590.00	3.8610	1.516	0.024	0.008	0.005	0.04290
2600.00	3.8462	1.519	0.022	0.008	0.005	0.04325
2610.00	3.8314	1.524	0.021	0.008	0.005	0.04390
2620.00	3.8168	1.525	0.023	0.008	0.005	0.04400
2630.00	3.8023	1.520	0.026	0.008	0.005	0.04335
2640.00	3.7879	1.523	0.021	0.008	0.005	0.04380
2650.00	3.7736	1.524	0.021	0.008	0.005	0.04395
2660.00	3.7594	1.524	0.019	0.008	0.005	0.04395
2670.00	3.7453	1.524	0.019	0.008	0.005	0.04385
2680.00	3.7313	1.529	0.017	0.008	0.005	0.04460
2690.00	3.7175	1.528	0.016	0.008	0.005	0.04445
2700.00	3.7037	1.532	0.016	0.008	0.005	0.04495
2710.00	3.6900	1.535	0.017	0.008	0.005	0.04540
2720.00	3.6765	1.534	0.021	0.008	0.005	0.04525
2730.00	3.6630	1.533	0.019	0.008	0.005	0.04510
2740.00	3.6496	1.533	0.016	0.008	0.005	0.04510

Table 18. Dolomite E Perpendicular to C-axis PAGE 6

WN	WL	N	K	DN	DK	R
2750.00	3.6364	1.536	0.018	0.008	0.005	0.04550
2760.00	3.6232	1.537	0.015	0.008	0.005	0.04565
2770.00	3.6101	1.537	0.018	0.008	0.005	0.04560
2780.00	3.5971	1.539	0.017	0.008	0.005	0.04590
2790.00	3.5842	1.538	0.018	0.008	0.005	0.04575
2800.00	3.5714	1.540	0.014	0.008	0.005	0.04595
2810.00	3.5587	1.542	0.014	0.008	0.005	0.04625
2820.00	3.5461	1.547	0.016	0.008	0.005	0.04695
2830.00	3.5336	1.544	0.018	0.008	0.005	0.04650
2840.00	3.5211	1.547	0.015	0.008	0.005	0.04695
2850.00	3.5088	1.550	0.019	0.008	0.005	0.04730
2860.00	3.4965	1.550	0.020	0.008	0.006	0.04735
2870.00	3.4843	1.551	0.024	0.008	0.006	0.04750
2880.00	3.4722	1.546	0.023	0.008	0.006	0.04685
2890.00	3.4602	1.549	0.025	0.008	0.006	0.04720
2900.00	3.4483	1.546	0.025	0.008	0.006	0.04690
2910.00	3.4364	1.542	0.022	0.008	0.005	0.04630
2920.00	3.4247	1.545	0.021	0.008	0.005	0.04665
2930.00	3.4130	1.547	0.020	0.008	0.005	0.04690
2940.00	3.4014	1.546	0.022	0.008	0.006	0.04685
2950.00	3.3898	1.547	0.020	0.008	0.005	0.04695
2960.00	3.3784	1.548	0.018	0.008	0.005	0.04710
2970.00	3.3670	1.548	0.023	0.008	0.006	0.04710
2980.00	3.3557	1.546	0.019	0.008	0.005	0.04680
2990.00	3.3445	1.552	0.019	0.008	0.006	0.04760
3000.00	3.3333	1.551	0.021	0.008	0.006	0.04750
3010.00	3.3223	1.547	0.023	0.008	0.006	0.04695
3020.00	3.3113	1.548	0.022	0.008	0.006	0.04710
3030.00	3.3003	1.544	0.019	0.008	0.005	0.04655
3040.00	3.2895	1.546	0.018	0.008	0.005	0.04685
3050.00	3.2787	1.549	0.016	0.008	0.005	0.04720
3060.00	3.2680	1.549	0.016	0.008	0.005	0.04725
3070.00	3.2573	1.548	0.015	0.008	0.005	0.04710
3080.00	3.2468	1.551	0.014	0.008	0.005	0.04745
3090.00	3.2362	1.553	0.013	0.008	0.005	0.04770
3100.00	3.2258	1.553	0.017	0.008	0.006	0.04780
3110.00	3.2154	1.553	0.013	0.008	0.005	0.04775
3120.00	3.2051	1.553	0.016	0.008	0.005	0.04770
3130.00	3.1949	1.554	0.012	0.008	0.005	0.04780
3140.00	3.1847	1.555	0.017	0.008	0.006	0.04800
3150.00	3.1746	1.554	0.013	0.008	0.005	0.04790
3160.00	3.1646	1.553	0.012	0.008	0.005	0.04775
3170.00	3.1546	1.558	0.013	0.008	0.005	0.04840
3180.00	3.1447	1.556	0.015	0.008	0.005	0.04815
3190.00	3.1348	1.556	0.014	0.008	0.005	0.04820
3200.00	3.1250	1.558	0.011	0.008	0.005	0.04845
3210.00	3.1153	1.559	0.013	0.008	0.005	0.04855
3220.00	3.1056	1.562	0.011	0.008	0.005	0.04890
3230.00	3.0960	1.560	0.016	0.008	0.006	0.04870
3240.00	3.0864	1.560	0.014	0.008	0.006	0.04865

Table 18. Dolomite E Perpendicular to C-axis PAGE 7

WN	WL	N	K	DN	DK	R
3250.00	3.0769	1.559	0.013	0.008	0.006	0.04860
3260.00	3.0675	1.561	0.013	0.008	0.006	0.04875
3270.00	3.0581	1.561	0.012	0.008	0.005	0.04875
3280.00	3.0488	1.564	0.012	0.008	0.006	0.04915
3290.00	3.0395	1.562	0.013	0.008	0.006	0.04890
3300.00	3.0303	1.563	0.013	0.008	0.006	0.04905
3310.00	3.0211	1.564	0.015	0.008	0.006	0.04925
3320.00	3.0120	1.561	0.014	0.008	0.006	0.04875
3330.00	3.0030	1.563	0.012	0.008	0.006	0.04905
3340.00	2.9940	1.563	0.012	0.008	0.006	0.04910
3350.00	2.9851	1.564	0.012	0.008	0.006	0.04920
3360.00	2.9762	1.564	0.012	0.008	0.006	0.04925
3370.00	2.9674	1.566	0.013	0.008	0.006	0.04950
3380.00	2.9586	1.566	0.014	0.008	0.006	0.04950
3390.00	2.9499	1.561	0.013	0.008	0.006	0.04885
3400.00	2.9412	1.566	0.011	0.008	0.006	0.04950
3410.00	2.9326	1.566	0.011	0.008	0.006	0.04950
3420.00	2.9240	1.568	0.014	0.008	0.006	0.04970
3430.00	2.9155	1.565	0.012	0.008	0.006	0.04930
3440.00	2.9070	1.566	0.010	0.008	0.006	0.04950
3450.00	2.8986	1.566	0.012	0.008	0.006	0.04950
3460.00	2.8902	1.569	0.011	0.008	0.006	0.04995
3470.00	2.8818	1.567	0.012	0.008	0.006	0.04955
3480.00	2.8736	1.568	0.012	0.008	0.006	0.04980
3490.00	2.8653	1.569	0.012	0.008	0.006	0.04985
3500.00	2.8571	1.566	0.013	0.008	0.006	0.04970
3510.00	2.8490	1.567	0.011	0.008	0.006	0.04960
3520.00	2.8409	1.568	0.012	0.008	0.006	0.04975
3530.00	2.8329	1.568	0.009	0.008	0.006	0.04975
3540.00	2.8249	1.570	0.010	0.008	0.006	0.05005
3550.00	2.8169	1.570	0.012	0.008	0.006	0.05005
3560.00	2.8090	1.570	0.011	0.008	0.006	0.05000
3570.00	2.8011	1.568	0.010	0.008	0.006	0.04980
3580.00	2.7933	1.569	0.012	0.008	0.006	0.04995
3590.00	2.7855	1.569	0.010	0.008	0.006	0.04990
3600.00	2.7778	1.568	0.011	0.008	0.006	0.04970
3610.00	2.7701	1.570	0.008	0.008	0.006	0.05000
3620.00	2.7624	1.570	0.010	0.008	0.006	0.05000
3630.00	2.7548	1.569	0.010	0.008	0.006	0.04990
3640.00	2.7473	1.567	0.007	0.008	0.005	0.04965
3650.00	2.7397	1.571	0.006	0.008	0.006	0.05020
3660.00	2.7322	1.571	0.009	0.008	0.006	0.05020
3670.00	2.7248	1.569	0.008	0.008	0.006	0.04990
3680.00	2.7174	1.571	0.006	0.008	0.006	0.05020
3690.00	2.7100	1.570	0.004	0.007	0.004	0.04995
3700.00	2.7027	1.574	0.006	0.007	0.006	0.05060
3710.00	2.6954	1.574	0.007	0.008	0.006	0.05050
3720.00	2.6882	1.574	0.007	0.008	0.006	0.05060
3730.00	2.6810	1.572	0.006	0.008	0.006	0.05030
3740.00	2.6738	1.575	0.005	0.007	0.005	0.05065

Table 18. Dolomite E Perpendicular to C-axis PAGE 8

WN	WL	N	K	DN	DK	R
3750.00	2.6667	1.572	0.008	0.008	0.006	0.05035
3760.00	2.6596	1.573	0.004	0.007	0.004	0.05040
3770.00	2.6525	1.574	0.005	0.007	0.005	0.05055
3780.00	2.6455	1.576	0.006	0.007	0.006	0.05085
3790.00	2.6385	1.573	0.003	0.007	0.003	0.05045
3800.00	2.6316	1.576	0.005	0.007	0.005	0.05080
3810.00	2.6247	1.574	0.005	0.007	0.005	0.05055
3820.00	2.6178	1.577	0.002	0.007	0.002	0.05090
3830.00	2.6110	1.573	0.002	0.007	0.002	0.05040
3840.00	2.6042	1.578	0.004	0.007	0.004	0.05115
3850.00	2.5974	1.575	0.002	0.007	0.002	0.05070
3860.00	2.5907	1.578	0.001	0.007	0.001	0.05110
3870.00	2.5840	1.576	0.005	0.007	0.005	0.05085
3880.00	2.5773	1.578	0.002	0.007	0.002	0.05115
3890.00	2.5707	1.576	0.002	0.007	0.002	0.05080
3900.00	2.5641	1.579	0.002	0.007	0.002	0.05130
3910.00	2.5575	1.576	0.003	0.007	0.003	0.05085
3920.00	2.5510	1.575	0.003	0.007	0.003	0.05075
3930.00	2.5445	1.576	0.001	0.007	0.001	0.05080
3940.00	2.5381	1.575	0.000	0.007	0.002	0.05070
3950.00	2.5316	1.578	0.000	0.007	0.002	0.05110
3960.00	2.5253	1.576	0.000	0.007	0.001	0.05080
3970.00	2.5189	1.578	0.000	0.007	0.005	0.05105
3980.00	2.5126	1.576	0.000	0.007	0.004	0.05080
3990.00	2.5063	1.579	0.000	0.007	0.006	0.05125
4000.00	2.5000	1.578	0.000	0.007	0.007	0.05115

# DOLOMITE O-RAY

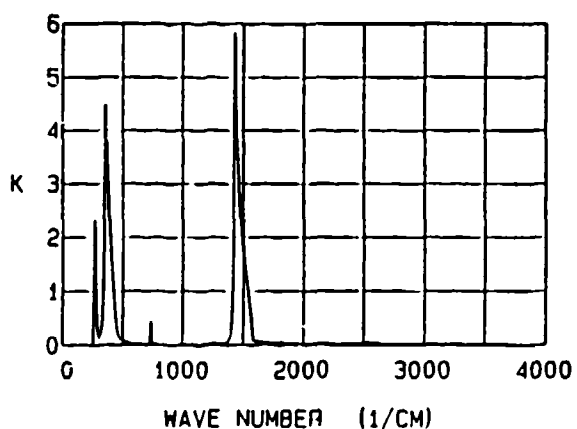
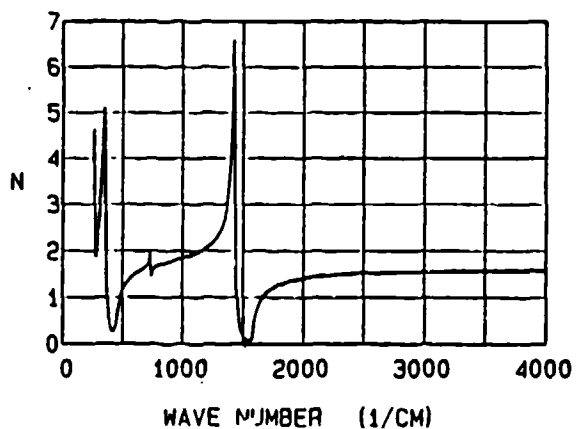
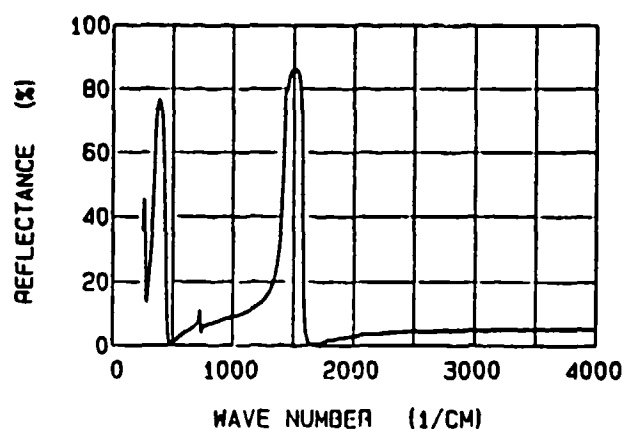


Figure 33. The infrared (180-4,000  $\text{cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of dolomite, E perpendicular to C.



Table 19. Dolomite E Parallel to C-axis.

PAGE 1

WN	WL	N	K	DN	DK	R
200.00	50.0000	0.789	0.026	0.007	0.001	0.01460
210.00	47.6190	1.252	0.165	0.008	0.006	0.01820
220.00	45.4545	1.444	0.232	0.006	0.004	0.04235
230.00	43.4783	1.613	0.315	0.005	0.004	0.06960
240.00	41.6667	1.708	0.347	0.005	0.004	0.08470
250.00	40.0000	1.852	0.380	0.005	0.003	0.10655
260.00	38.4615	1.968	0.501	0.005	0.004	0.13270
270.00	37.0370	1.970	0.544	0.005	0.004	0.13730
280.00	35.7143	2.111	0.506	0.005	0.004	0.15175
290.00	34.4828	2.340	0.595	0.006	0.004	0.18875
300.00	33.3333	2.682	0.827	0.006	0.005	0.24885
310.00	32.2581	2.656	1.756	0.002	0.007	0.35655
320.00	31.2500	1.734	1.763	0.001	0.004	0.34720
330.00	30.3030	1.656	1.275	0.000	0.004	0.23910
340.00	29.4118	2.005	1.142	0.002	0.005	0.22605
350.00	28.5714	2.495	1.644	0.002	0.006	0.33335
360.00	27.7778	1.930	2.702	0.002	0.005	0.51630
370.00	27.0270	0.839	2.548	0.003	0.002	0.66205
380.00	26.3158	0.387	2.028	0.002	0.001	0.74545
390.00	25.6410	0.239	1.594	0.001	0.000	0.76760
400.00	25.0000	0.198	1.266	0.001	0.000	0.74165
410.00	24.3902	0.195	0.998	0.001	0.000	0.68150
420.00	23.8095	0.222	0.751	0.001	0.000	0.57405
430.00	23.2558	0.296	0.521	0.001	0.000	0.40120
440.00	22.7273	0.425	0.336	0.001	0.000	0.21430
450.00	22.2222	0.576	0.222	0.002	0.001	0.09390
460.00	21.7391	0.711	0.169	0.003	0.002	0.03920
470.00	21.2766	0.808	0.147	0.005	0.003	0.01835
480.00	20.8333	0.892	0.128	0.007	0.007	0.00805
490.00	20.4082	0.953	0.124	0.006	0.013	0.00475
500.00	20.0000	1.004	0.118	0.000	0.017	0.00355
510.00	19.6078	1.040	0.117	0.005	0.016	0.00375
520.00	19.2308	1.074	0.096	0.010	0.015	0.00350
530.00	18.8679	1.116	0.091	0.012	0.010	0.00495
540.00	18.5185	1.144	0.085	0.012	0.008	0.00620
550.00	18.1818	1.178	0.083	0.012	0.006	0.00830
560.00	17.8571	1.200	0.077	0.011	0.005	0.00970
570.00	17.5439	1.226	0.075	0.011	0.004	0.01165
580.00	17.2414	1.245	0.070	0.011	0.003	0.01310
590.00	16.9492	1.271	0.067	0.010	0.003	0.01540
600.00	16.6667	1.295	0.067	0.010	0.002	0.01770
610.00	16.3934	1.311	0.070	0.009	0.002	0.01935
620.00	16.1290	1.326	0.074	0.009	0.002	0.02100
630.00	15.8730	1.343	0.076	0.009	0.002	0.02290
640.00	15.6250	1.340	0.074	0.009	0.002	0.02250
650.00	15.3846	1.359	0.067	0.009	0.002	0.02435
660.00	15.1515	1.376	0.064	0.009	0.002	0.02620
670.00	14.9254	1.391	0.061	0.008	0.002	0.02790
680.00	14.7059	1.402	0.065	0.008	0.002	0.02920
690.00	14.4928	1.415	0.063	0.008	0.001	0.03070

Table 19. Dolomite E Parallel to C-axis.

PAGE 2

WN	WL	N	K	DN	DK	R
700.00	14.2857	1.428	0.059	0.008	0.001	0.03225
710.00	14.0845	1.443	0.057	0.008	0.001	0.03405
720.00	13.8889	1.468	0.060	0.008	0.001	0.03715
730.00	13.6986	1.466	0.090	0.008	0.002	0.03760
740.00	13.5135	1.456	0.061	0.008	0.001	0.03570
750.00	13.3333	1.481	0.053	0.008	0.001	0.03865
760.00	13.1579	1.499	0.051	0.008	0.001	0.04095
770.00	12.9870	1.518	0.047	0.008	0.001	0.04340
780.00	12.8205	1.539	0.047	0.008	0.001	0.04610
790.00	12.6582	1.562	0.044	0.007	0.001	0.04920
800.00	12.5000	1.590	0.042	0.007	0.001	0.05295
810.00	12.3457	1.622	0.041	0.007	0.001	0.05735
820.00	12.1951	1.663	0.037	0.007	0.000	0.06320
830.00	12.0482	1.722	0.035	0.007	0.000	0.07150
840.00	11.9048	1.806	0.026	0.007	0.000	0.08380
850.00	11.7647	1.949	0.057	0.007	0.001	0.10520
860.00	11.6279	2.162	0.017	0.007	0.000	0.13665
870.00	11.4943	3.410	0.004	0.009	0.000	0.30090
880.00	11.3636	0.829	3.271	0.004	0.002	0.76525
890.00	11.2360	0.097	1.226	0.001	0.000	0.85825
900.00	11.1111	0.296	0.296	0.001	0.000	0.34505
910.00	10.9890	0.902	0.010	0.017	0.002	0.00275
920.00	10.8696	1.030	0.072	0.009	0.025	0.00150
930.00	10.7527	1.122	0.065	0.015	0.009	0.00435
940.00	10.6383	1.182	0.063	0.013	0.005	0.00795
950.00	10.5263	1.224	0.061	0.011	0.003	0.01110
960.00	10.4167	1.255	0.059	0.011	0.003	0.01370
970.00	10.3093	1.281	0.058	0.010	0.002	0.01610
980.00	10.2041	1.300	0.055	0.010	0.002	0.01795
990.00	10.1010	1.318	0.055	0.009	0.002	0.01975
1000.00	10.0000	1.333	0.055	0.009	0.002	0.02135
1010.00	9.9010	1.346	0.053	0.009	0.002	0.02270
1020.00	9.8039	1.359	0.055	0.009	0.002	0.02410
1030.00	9.7087	1.366	0.054	0.009	0.001	0.02490
1040.00	9.6154	1.376	0.052	0.009	0.001	0.02595
1050.00	9.5238	1.385	0.054	0.009	0.001	0.02700
1060.00	9.4340	1.389	0.053	0.009	0.001	0.02750
1070.00	9.3458	1.397	0.053	0.008	0.001	0.02840
1080.00	9.2593	1.403	0.052	0.008	0.001	0.02905
1090.00	9.1743	1.410	0.051	0.008	0.001	0.02995
1100.00	9.0909	1.414	0.057	0.008	0.001	0.03045
1110.00	9.0090	1.416	0.053	0.008	0.001	0.03065
1120.00	8.9286	1.419	0.052	0.008	0.001	0.03095
1130.00	8.8496	1.423	0.050	0.008	0.001	0.03145
1140.00	8.7719	1.429	0.049	0.008	0.001	0.03210
1150.00	8.6957	1.434	0.048	0.008	0.001	0.03275
1160.00	8.6207	1.437	0.049	0.008	0.001	0.03310
1170.00	8.5470	1.440	0.047	0.008	0.001	0.03350
1180.00	8.4746	1.444	0.047	0.008	0.001	0.03400
1190.00	8.4034	1.449	0.046	0.008	0.001	0.03455

Table 19. Dolomite E Parallel to C-axis.

PAGE 3

WN	WL	N	K	DN	DK	R
1200.00	8.3333	1.450	0.047	0.008	0.001	0.03470
1210.00	8.2645	1.454	0.047	0.008	0.001	0.03525
1220.00	8.1967	1.457	0.044	0.008	0.001	0.03555
1230.00	8.1301	1.461	0.046	0.008	0.001	0.03605
1240.00	8.0645	1.464	0.044	0.008	0.001	0.03640
1250.00	8.0000	1.467	0.044	0.008	0.001	0.03675
1260.00	7.9365	1.470	0.045	0.008	0.001	0.03715
1270.00	7.8740	1.473	0.043	0.008	0.001	0.03755
1280.00	7.8125	1.477	0.043	0.008	0.001	0.03805
1290.00	7.7519	1.479	0.041	0.008	0.001	0.03825
1300.00	7.6923	1.484	0.042	0.008	0.001	0.03890
1310.00	7.6336	1.485	0.041	0.008	0.001	0.03900
1320.00	7.5758	1.490	0.041	0.008	0.001	0.03960
1330.00	7.5188	1.492	0.039	0.008	0.001	0.03990
1340.00	7.4627	1.498	0.039	0.008	0.001	0.04065
1350.00	7.4074	1.500	0.038	0.008	0.001	0.04090
1360.00	7.3529	1.507	0.035	0.008	0.001	0.04180
1370.00	7.2993	1.511	0.036	0.008	0.001	0.04235
1380.00	7.2464	1.518	0.035	0.008	0.001	0.04320
1390.00	7.1942	1.523	0.035	0.008	0.001	0.04390
1400.00	7.1429	1.532	0.035	0.008	0.001	0.04505
1410.00	7.0922	1.536	0.035	0.008	0.001	0.04565
1420.00	7.0423	1.547	0.034	0.008	0.001	0.04705
1430.00	6.9930	1.556	0.037	0.007	0.001	0.04835
1440.00	6.9444	1.564	0.038	0.007	0.001	0.04940
1450.00	6.8966	1.576	0.037	0.007	0.001	0.05095
1460.00	6.8493	1.589	0.042	0.007	0.001	0.05280
1470.00	6.8027	1.602	0.042	0.007	0.001	0.05460
1480.00	6.7568	1.620	0.043	0.007	0.001	0.05715
1490.00	6.7114	1.641	0.046	0.007	0.001	0.06020
1500.00	6.6667	1.672	0.049	0.007	0.001	0.06460
1510.00	6.6225	1.712	0.052	0.007	0.001	0.07025
1520.00	6.5789	1.774	0.062	0.007	0.001	0.07945
1530.00	6.5359	1.869	0.079	0.007	0.001	0.09365
1540.00	6.4935	2.075	0.117	0.007	0.001	0.12495
1550.00	6.4516	2.671	0.485	0.007	0.003	0.22280
1560.00	6.4103	1.380	2.163	0.002	0.003	0.46885
1570.00	6.3694	0.470	0.869	0.001	0.001	0.35955
1580.00	6.3291	0.734	0.181	0.004	0.002	0.03510
1590.00	6.2893	1.046	0.097	0.008	0.018	0.00280
1600.00	6.2500	1.150	0.082	0.012	0.007	0.00645
1610.00	6.2112	1.208	0.067	0.012	0.004	0.01000
1620.00	6.1728	1.253	0.056	0.011	0.003	0.01350
1630.00	6.1350	1.288	0.052	0.010	0.002	0.01665
1640.00	6.0976	1.310	0.051	0.010	0.002	0.01890
1650.00	6.0606	1.325	0.051	0.009	0.002	0.02040
1660.00	6.0241	1.342	0.045	0.009	0.001	0.02210
1670.00	5.9880	1.354	0.045	0.009	0.001	0.02340
1680.00	5.9524	1.363	0.046	0.009	0.001	0.02440
1690.00	5.9172	1.371	0.044	0.009	0.001	0.02525

WN	WL	N	K	DN	DK	R
1700.00	5.8824	1.379	0.042	0.009	0.001	0.02615
1710.00	5.8480	1.385	0.043	0.009	0.001	0.02685
1720.00	5.8140	1.389	0.041	0.009	0.001	0.02725
1730.00	5.7803	1.395	0.039	0.009	0.001	0.02795
1740.00	5.7471	1.400	0.038	0.009	0.001	0.02860
1750.00	5.7143	1.404	0.039	0.008	0.001	0.02905
1760.00	5.6818	1.408	0.038	0.008	0.001	0.02950
1770.00	5.6497	1.412	0.038	0.008	0.001	0.03000
1780.00	5.6180	1.415	0.037	0.008	0.001	0.03025
1790.00	5.5866	1.418	0.039	0.008	0.001	0.03070
1800.00	5.5556	1.420	0.038	0.008	0.001	0.03095
1810.00	5.5249	1.421	0.040	0.008	0.001	0.03110
1820.00	5.4945	1.421	0.040	0.008	0.001	0.03105
1830.00	5.4645	1.422	0.036	0.008	0.001	0.03110
1840.00	5.4348	1.423	0.034	0.008	0.001	0.03120
1850.00	5.4054	1.426	0.031	0.008	0.001	0.03160
1860.00	5.3763	1.430	0.031	0.008	0.001	0.03205
1870.00	5.3476	1.433	0.031	0.008	0.001	0.03235
1880.00	5.3191	1.433	0.031	0.008	0.001	0.03240
1890.00	5.2910	1.436	0.029	0.008	0.001	0.03275
1900.00	5.2632	1.438	0.031	0.008	0.001	0.03305
1910.00	5.2356	1.438	0.029	0.008	0.001	0.03300
1920.00	5.2083	1.441	0.029	0.008	0.001	0.03335
1930.00	5.1813	1.444	0.030	0.008	0.001	0.03375
1940.00	5.1546	1.442	0.029	0.008	0.001	0.03345
1950.00	5.1282	1.447	0.028	0.008	0.001	0.03405
1960.00	5.1020	1.446	0.030	0.008	0.001	0.03400
1970.00	5.0761	1.446	0.030	0.008	0.001	0.03405
1980.00	5.0505	1.447	0.028	0.008	0.001	0.03415
1990.00	5.0251	1.450	0.027	0.008	0.001	0.03450
2000.00	5.0000	1.450	0.029	0.008	0.001	0.03450
2010.00	4.9751	1.452	0.027	0.008	0.001	0.03470
2020.00	4.9505	1.452	0.028	0.008	0.001	0.03475
2030.00	4.9261	1.455	0.027	0.008	0.001	0.03510
2040.00	4.9020	1.454	0.031	0.008	0.001	0.03505
2050.00	4.8780	1.451	0.027	0.008	0.001	0.03460
2060.00	4.8544	1.456	0.025	0.008	0.001	0.03515
2070.00	4.8309	1.458	0.026	0.008	0.001	0.03545
2080.00	4.8077	1.457	0.027	0.008	0.001	0.03535
2090.00	4.7847	1.460	0.028	0.008	0.001	0.03565
2100.00	4.7619	1.459	0.028	0.008	0.001	0.03555
2110.00	4.7393	1.459	0.027	0.008	0.001	0.03555
2120.00	4.7170	1.460	0.027	0.008	0.001	0.03575
2130.00	4.6948	1.461	0.028	0.008	0.001	0.03580
2140.00	4.6729	1.459	0.026	0.008	0.001	0.03560
2150.00	4.6512	1.462	0.025	0.008	0.001	0.03590
2160.00	4.6296	1.462	0.026	0.008	0.001	0.03595
2170.00	4.6083	1.462	0.026	0.008	0.001	0.03590
2180.00	4.5872	1.464	0.025	0.008	0.001	0.03620
2190.00	4.5662	1.463	0.027	0.008	0.001	0.03610

WN	WL	N	K	DN	DK	R
2200.00	4.5455	1.463	0.024	0.008	0.000	0.03610
2210.00	4.5249	1.465	0.024	0.008	0.001	0.03630
2220.00	4.5045	1.465	0.024	0.008	0.000	0.03630
2230.00	4.4843	1.466	0.024	0.008	0.000	0.03640
2240.00	4.4643	1.467	0.024	0.008	0.000	0.03655
2250.00	4.4444	1.467	0.024	0.008	0.000	0.03655
2260.00	4.4248	1.468	0.023	0.008	0.000	0.03670
2270.00	4.4053	1.466	0.024	0.008	0.000	0.03645
2280.00	4.3860	1.469	0.024	0.008	0.000	0.03675
2290.00	4.3668	1.469	0.024	0.008	0.000	0.03675
2300.00	4.3478	1.470	0.023	0.008	0.000	0.03690
2310.00	4.3290	1.470	0.024	0.008	0.000	0.03690
2320.00	4.3103	1.468	0.025	0.008	0.001	0.03670
2330.00	4.2918	1.469	0.022	0.008	0.000	0.03675
2340.00	4.2735	1.473	0.022	0.008	0.000	0.03725
2350.00	4.2553	1.470	0.027	0.008	0.001	0.03700
2360.00	4.2373	1.467	0.023	0.008	0.000	0.03650
2370.00	4.2194	1.471	0.019	0.008	0.000	0.03700
2380.00	4.2017	1.471	0.022	0.008	0.000	0.03710
2390.00	4.1841	1.474	0.023	0.008	0.000	0.03750
2400.00	4.1667	1.471	0.023	0.008	0.000	0.03700
2410.00	4.1494	1.471	0.020	0.008	0.000	0.03705
2420.00	4.1322	1.473	0.021	0.008	0.000	0.03730
2430.00	4.1152	1.473	0.021	0.008	0.000	0.03735
2440.00	4.0984	1.474	0.021	0.008	0.000	0.03740
2450.00	4.0816	1.473	0.021	0.008	0.000	0.03735
2460.00	4.0650	1.475	0.019	0.008	0.000	0.03750
2470.00	4.0486	1.477	0.020	0.008	0.000	0.03780
2480.00	4.0323	1.476	0.023	0.008	0.000	0.03775
2490.00	4.0161	1.476	0.021	0.008	0.000	0.03770
2500.00	4.0000	1.476	0.020	0.008	0.000	0.03770
2510.00	3.9841	1.477	0.021	0.008	0.000	0.03780
2520.00	3.9683	1.478	0.022	0.008	0.000	0.03790
2530.00	3.9526	1.477	0.022	0.008	0.000	0.03775
2540.00	3.9370	1.477	0.024	0.008	0.000	0.03780
2550.00	3.9216	1.476	0.022	0.008	0.000	0.03765
2560.00	3.9063	1.474	0.021	0.008	0.000	0.03740
2570.00	3.8911	1.474	0.019	0.008	0.000	0.03745
2580.00	3.8760	1.478	0.018	0.008	0.000	0.03795
2590.00	3.8610	1.478	0.020	0.008	0.000	0.03790
2600.00	3.8462	1.479	0.021	0.008	0.000	0.03805
2610.00	3.8314	1.478	0.020	0.008	0.000	0.03795
2620.00	3.8168	1.479	0.020	0.008	0.000	0.03805
2630.00	3.8023	1.473	0.022	0.008	0.000	0.03735
2640.00	3.7879	1.478	0.017	0.008	0.000	0.03790
2650.00	3.7736	1.479	0.018	0.008	0.000	0.03810
2660.00	3.7594	1.478	0.020	0.008	0.000	0.03790
2670.00	3.7453	1.479	0.019	0.008	0.000	0.03810
2680.00	3.7313	1.479	0.018	0.008	0.000	0.03810
2690.00	3.7175	1.479	0.020	0.008	0.000	0.03810

Table 19. Dolomite E Parallel to C-axis.

PAGE 6

WN	WL	N	K	DN	DK	R
2700.00	3.7037	1.478	0.018	0.008	0.000	0.03790
2710.00	3.6900	1.481	0.018	0.008	0.000	0.03825
2720.00	3.6765	1.479	0.021	0.008	0.000	0.03800
2730.00	3.6630	1.477	0.020	0.008	0.000	0.03780
2740.00	3.6496	1.476	0.016	0.008	0.000	0.03765
2750.00	3.6364	1.480	0.016	0.008	0.000	0.03820
2760.00	3.6232	1.481	0.016	0.008	0.000	0.03825
2770.00	3.6101	1.480	0.017	0.008	0.000	0.03815
2780.00	3.5971	1.481	0.017	0.008	0.000	0.03830
2790.00	3.5842	1.481	0.017	0.008	0.000	0.03825
2800.00	3.5714	1.479	0.017	0.008	0.000	0.03800
2810.00	3.5587	1.481	0.015	0.008	0.000	0.03825
2820.00	3.5461	1.481	0.016	0.008	0.000	0.03835
2830.00	3.5336	1.482	0.015	0.008	0.000	0.03835
2840.00	3.5211	1.484	0.015	0.008	0.000	0.03860
2850.00	3.5088	1.482	0.017	0.008	0.000	0.03845
2860.00	3.4965	1.484	0.016	0.008	0.000	0.03870
2870.00	3.4843	1.483	0.018	0.008	0.000	0.03855
2880.00	3.4722	1.482	0.014	0.008	0.000	0.03835
2890.00	3.4602	1.485	0.016	0.008	0.000	0.03880
2900.00	3.4483	1.485	0.017	0.008	0.000	0.03875
2910.00	3.4364	1.480	0.017	0.008	0.000	0.03815
2920.00	3.4247	1.485	0.012	0.008	0.000	0.03880
2930.00	3.4130	1.486	0.017	0.008	0.000	0.03895
2940.00	3.4014	1.483	0.019	0.008	0.000	0.03860
2950.00	3.3898	1.482	0.017	0.008	0.000	0.03845
2960.00	3.3784	1.484	0.014	0.008	0.000	0.03860
2970.00	3.3670	1.483	0.018	0.008	0.000	0.03850
2980.00	3.3557	1.483	0.014	0.008	0.000	0.03850
2990.00	3.3445	1.486	0.016	0.008	0.000	0.03895
3000.00	3.3333	1.483	0.016	0.008	0.000	0.03855
3010.00	3.3223	1.482	0.015	0.008	0.000	0.03840
3020.00	3.3113	1.486	0.015	0.008	0.000	0.03895
3030.00	3.3003	1.481	0.016	0.008	0.000	0.03835
3040.00	3.2895	1.482	0.015	0.008	0.000	0.03840
3050.00	3.2787	1.485	0.014	0.008	0.000	0.03880
3060.00	3.2680	1.482	0.015	0.008	0.000	0.03845
3070.00	3.2573	1.484	0.013	0.008	0.000	0.03860
3080.00	3.2468	1.483	0.015	0.008	0.000	0.03855
3090.00	3.2362	1.484	0.012	0.008	0.000	0.03870
3100.00	3.2258	1.484	0.017	0.008	0.000	0.03870
3110.00	3.2154	1.481	0.010	0.008	0.000	0.03830
3120.00	3.2051	1.485	0.014	0.008	0.000	0.03875
3130.00	3.1949	1.484	0.010	0.008	0.000	0.03870
3140.00	3.1847	1.487	0.015	0.008	0.000	0.03910
3150.00	3.1746	1.482	0.012	0.008	0.000	0.03845
3160.00	3.1646	1.483	0.010	0.008	0.000	0.03855
3170.00	3.1546	1.489	0.013	0.008	0.000	0.03925
3180.00	3.1447	1.484	0.013	0.008	0.000	0.03860
3190.00	3.1348	1.486	0.012	0.008	0.000	0.03885

Table 19. Dolomite E Parallel to C-axis.

PAGE 7

WN	WL	N	K	DN	DK	R
3200.00	3.1250	1.485	0.012	0.008	0.000	0.03880
3210.00	3.1153	1.484	0.012	0.008	0.000	0.03865
3220.00	3.1056	1.486	0.007	0.008	0.000	0.03885
3230.00	3.0960	1.487	0.013	0.008	0.000	0.03910
3240.00	3.0864	1.489	0.010	0.008	0.000	0.03925
3250.00	3.0769	1.487	0.015	0.008	0.000	0.03905
3260.00	3.0675	1.487	0.010	0.008	0.000	0.03900
3270.00	3.0581	1.486	0.013	0.008	0.000	0.03890
3280.00	3.0488	1.488	0.011	0.008	0.000	0.03910
3290.00	3.0395	1.486	0.009	0.008	0.000	0.03885
3300.00	3.0303	1.489	0.011	0.008	0.000	0.03935
3310.00	3.0211	1.490	0.013	0.008	0.000	0.03945
3320.00	3.0120	1.485	0.012	0.008	0.000	0.03880
3330.00	3.0030	1.487	0.009	0.008	0.000	0.03905
3340.00	2.9940	1.492	0.010	0.008	0.000	0.03965
3350.00	2.9851	1.487	0.015	0.008	0.000	0.03905
3360.00	2.9762	1.488	0.011	0.008	0.000	0.03910
3370.00	2.9674	1.488	0.011	0.008	0.000	0.03910
3380.00	2.9586	1.489	0.013	0.008	0.000	0.03925
3390.00	2.9499	1.485	0.011	0.008	0.000	0.03880
3400.00	2.9412	1.488	0.010	0.008	0.000	0.03920
3410.00	2.9326	1.488	0.010	0.008	0.000	0.03910
3420.00	2.9240	1.490	0.013	0.008	0.000	0.03940
3430.00	2.9155	1.488	0.010	0.008	0.000	0.03910
3440.00	2.9070	1.489	0.011	0.008	0.000	0.03925
3450.00	2.8986	1.486	0.012	0.008	0.000	0.03895
3460.00	2.8902	1.488	0.010	0.008	0.000	0.03910
3470.00	2.8818	1.490	0.009	0.008	0.000	0.03940
3480.00	2.8736	1.488	0.012	0.008	0.000	0.03920
3490.00	2.8653	1.490	0.012	0.008	0.000	0.03945
3500.00	2.8571	1.486	0.011	0.008	0.000	0.03890
3510.00	2.8490	1.487	0.010	0.008	0.000	0.03905
3520.00	2.8409	1.489	0.011	0.008	0.000	0.03925
3530.00	2.8329	1.486	0.008	0.008	0.000	0.03895
3540.00	2.8249	1.486	0.010	0.008	0.000	0.03895
3550.00	2.8169	1.487	0.007	0.008	0.000	0.03905
3560.00	2.8090	1.490	0.009	0.008	0.000	0.03935
3570.00	2.8011	1.487	0.010	0.008	0.000	0.03900
3580.00	2.7933	1.492	0.007	0.008	0.000	0.03965
3590.00	2.7855	1.488	0.012	0.008	0.000	0.03920
3600.00	2.7778	1.485	0.011	0.008	0.000	0.03875
3610.00	2.7701	1.487	0.007	0.008	0.000	0.03905
3620.00	2.7624	1.486	0.008	0.008	0.000	0.03895
3630.00	2.7548	1.488	0.008	0.008	0.000	0.03915
3640.00	2.7473	1.488	0.007	0.008	0.000	0.03920
3650.00	2.7397	1.487	0.006	0.008	0.000	0.03900
3660.00	2.7322	1.490	0.008	0.008	0.000	0.03935
3670.00	2.7248	1.486	0.007	0.008	0.000	0.03890
3680.00	2.7174	1.488	0.005	0.008	0.000	0.03920
3690.00	2.7100	1.488	0.006	0.008	0.000	0.03920

Table 19. Dolomite E Parallel to C-axis.

PAGE 8

WN	WL	N	K	DN	DK	R
3700.00	2.7027	1.490	0.006	0.008	0.000	0.03935
3710.00	2.6954	1.492	0.006	0.008	0.000	0.03960
3720.00	2.6882	1.487	0.008	0.008	0.000	0.03900
3730.00	2.6810	1.488	0.003	0.008	0.000	0.03920
3740.00	2.6738	1.490	0.005	0.008	0.000	0.03935
3750.00	2.6667	1.488	0.005	0.008	0.000	0.03920
3760.00	2.6596	1.492	0.003	0.008	0.000	0.03970
3770.00	2.6525	1.490	0.008	0.008	0.000	0.03935
3780.00	2.6455	1.493	0.006	0.008	0.000	0.03980
3790.00	2.6385	1.488	0.006	0.008	0.000	0.03910
3800.00	2.6316	1.490	0.004	0.008	0.000	0.03945
3810.00	2.6247	1.490	0.005	0.008	0.000	0.03940
3820.00	2.6178	1.492	0.004	0.008	0.000	0.03965
3830.00	2.6110	1.488	0.005	0.008	0.000	0.03915
3840.00	2.6042	1.492	0.003	0.008	0.000	0.03970
3850.00	2.5974	1.490	0.004	0.008	0.000	0.03940
3860.00	2.5907	1.493	0.003	0.008	0.000	0.03980
3870.00	2.5840	1.491	0.007	0.008	0.000	0.03955
3880.00	2.5773	1.490	0.004	0.008	0.000	0.03935
3890.00	2.5707	1.490	0.002	0.008	0.000	0.03940
3900.00	2.5641	1.493	0.003	0.008	0.000	0.03975
3910.00	2.5575	1.493	0.004	0.008	0.000	0.03985
3920.00	2.5510	1.488	0.006	0.008	0.000	0.03920
3930.00	2.5445	1.489	0.004	0.008	0.000	0.03930
3940.00	2.5381	1.488	0.001	0.008	0.000	0.03910
3950.00	2.5316	1.489	0.000	0.008	0.000	0.03925
3960.00	2.5253	1.490	0.001	0.008	0.000	0.03935
3970.00	2.5189	1.491	0.000	0.008	0.001	0.03955
3980.00	2.5126	1.490	0.000	0.008	0.001	0.03940
3990.00	2.5063	1.492	0.000	0.008	0.002	0.03960
4000.00	2.5000	1.492	0.000	0.008	0.002	0.03960



#### 4.16 Molybdenum (Mo).

Comprehensive description of our investigations of the optical properties of molybdenum were presented previously by W.P. Roach.<sup>16</sup> We will present here only a brief outline of the material previously presented by W.P. Roach.

Samples of molybdenum were obtained from Aesare (Johnson Matthey) as 12.7 mm dia. rod of 99.97% purity and as 1x50x50 mm<sup>3</sup> foil of 99.97% purity. Also from Laser Power Optics we acquired a 0.938 inch dia. molybdenum mirror flat to 2 fringes @ 632.8 nm and about 95% purity. The rod and foil samples were mechanically polished using successively smaller grit diamond paste.

The near normal incidence reflectance spectra of the three samples were acquired throughout the 180-50,000 cm<sup>-1</sup> spectral region. The reflectance spectrum of molybdenum from Weaver et al.<sup>17</sup> was used to extend the spectral region from 50,000 cm<sup>-1</sup> to 322,580 cm<sup>-1</sup>. In the low frequency region a Drude fit to the reflectance spectrum in the 180-0 cm<sup>-1</sup> was used to extend the reflectance spectra to <180 cm<sup>-1</sup>.

Kramers-Kronig analysis of the reflectance spectra provided spectral values for the complex refractive index. In Figures 34 and 35, and in Table 20, we present the reflectance spectrum and the complex refractive index for the molybdenum rod. The rod sample was chosen for presentation here because it was the sample with the best surface polish, and because data acquired for that sample were the most reproducible. The reflectance spectrum of the 0.938 inch dia. mirror possessed, in the visible and

ultraviolet spectral regions, all the attributes of a spectrum of a microscopic rough surface.

For more detail the reader should consult Reference 16.

# MOLYBDENUM

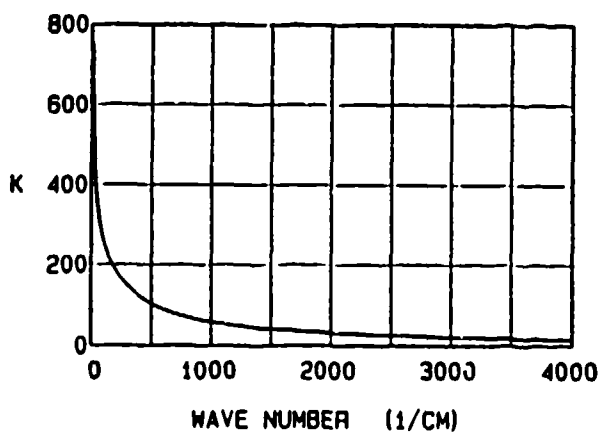
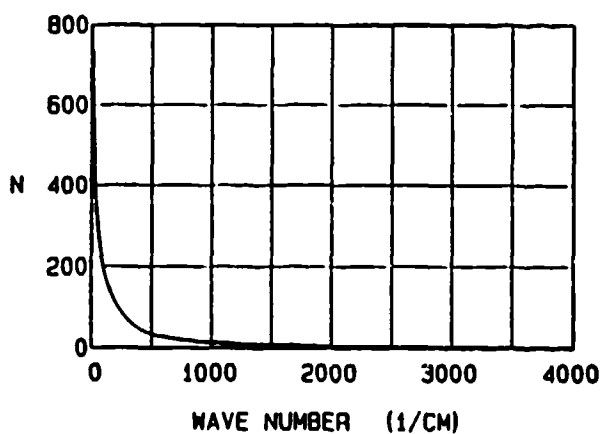
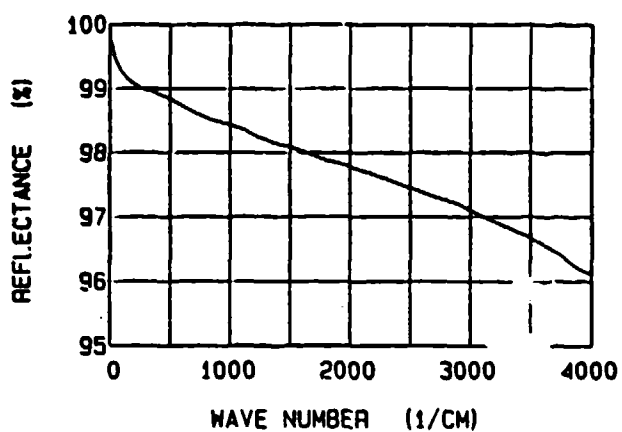


Figure 34. The infrared (180–4,000  $\text{cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of molybdenum.

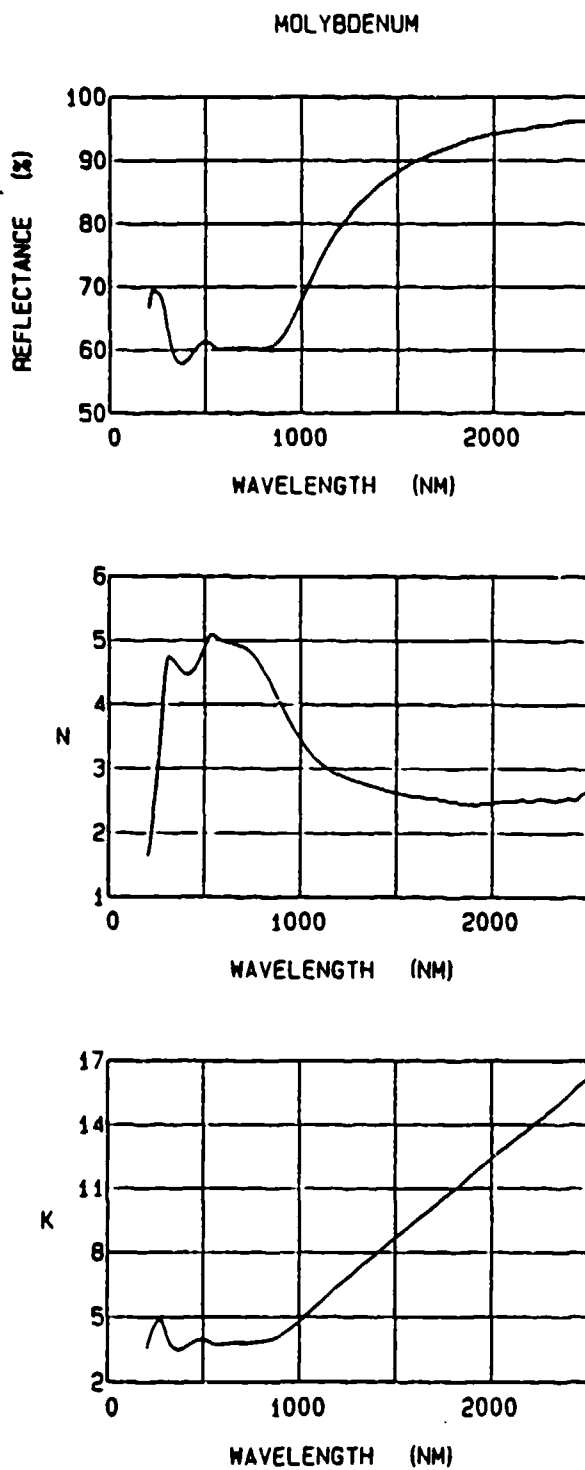


Figure 35. The uv-vis-nir (200-2,500 nm) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of molybdenum.

Table 20. Molybdenum.

PAGE 1

WN	WL	N	K	DN	DK	R
60.00	166.6667	270.096	322.395	22.961	111.545	0.99395
80.00	125.0000	224.631	283.514	21.862	81.820	0.99320
100.00	100.0000	192.784	255.525	20.413	63.490	0.99255
120.00	83.3333	168.749	235.684	19.510	51.454	0.99205
140.00	71.4286	149.632	219.334	18.457	42.636	0.99160
160.00	62.5000	133.668	206.346	17.655	36.006	0.99125
180.00	55.5556	120.296	195.235	16.834	30.820	0.99095
200.00	50.0000	109.253	185.161	15.883	26.688	0.99065
220.00	45.4545	99.422	176.285	15.032	23.260	0.99040
240.00	41.6667	90.723	168.463	14.265	20.417	0.99020
260.00	38.4615	83.143	161.135	13.471	18.020	0.99000
280.00	35.7143	76.393	154.672	12.770	16.011	0.98985
300.00	33.3333	70.243	148.866	12.142	14.285	0.98975
320.00	31.2500	64.492	143.513	11.561	12.761	0.98970
340.00	29.4118	59.095	137.739	10.876	11.335	0.98960
360.00	27.7778	54.173	132.141	10.197	10.076	0.98950
380.00	26.3158	50.940	127.025	9.518	9.177	0.98925
400.00	25.0000	47.637	122.492	8.954	8.351	0.98910
420.00	23.8095	44.375	118.213	8.438	7.587	0.98900
440.00	22.7273	41.626	113.817	7.895	6.919	0.98880
460.00	21.7391	38.991	110.066	7.453	6.336	0.98870
480.00	20.8333	36.981	106.221	6.987	5.850	0.98845
500.00	20.0000	34.740	102.832	6.601	5.381	0.98835
520.00	19.2308	32.727	99.426	6.215	4.957	0.98820
540.00	18.5185	31.645	96.363	5.858	4.672	0.98785
560.00	17.8571	30.208	93.528	5.547	4.369	0.98765
580.00	17.2414	28.936	90.926	5.268	4.105	0.98745
600.00	16.6667	27.701	88.382	5.000	3.855	0.98725
620.00	16.1290	26.743	86.060	4.758	3.651	0.98700
640.00	15.6250	25.775	83.928	4.543	3.461	0.98680
660.00	15.1515	24.700	81.810	4.335	3.266	0.98665
680.00	14.7059	23.882	79.911	4.150	3.109	0.98645
700.00	14.2857	23.269	78.029	3.968	2.975	0.98615
720.00	13.8889	22.224	76.257	3.806	2.811	0.98610
740.00	13.5135	21.596	74.678	3.661	2.695	0.98590
760.00	13.1579	20.937	73.060	3.515	2.577	0.98570
780.00	12.8205	20.254	71.547	3.381	2.464	0.98555
800.00	12.5000	19.407	70.022	3.250	2.340	0.98550
820.00	12.1951	18.931	68.711	3.137	2.256	0.98530
840.00	11.9048	18.365	67.382	3.025	2.165	0.98515
860.00	11.6279	17.893	66.212	2.928	2.089	0.98500
880.00	11.3636	17.197	65.003	2.830	1.997	0.98500
900.00	11.1111	16.699	63.777	2.731	1.921	0.98485
920.00	10.8696	16.063	62.521	2.632	1.835	0.98480
940.00	10.6383	15.659	61.458	2.549	1.773	0.98465
960.00	10.4167	15.134	60.378	2.466	1.704	0.98460
980.00	10.2041	14.710	59.270	2.382	1.642	0.98445
1000.00	10.0000	14.303	58.194	2.301	1.583	0.98430
1020.00	9.8039	13.827	57.178	2.227	1.523	0.98425
1040.00	9.6154	13.558	56.272	2.161	1.480	0.98405

Table 20. Molybdenum.

PAGE 2

WN	WL	N	K	DN	DK	R
1060.00	9.4340	13.326	55.446	2.102	1.442	0.98385
1080.00	9.2593	12.910	54.532	2.037	1.391	0.98380
1100.00	9.0909	12.679	53.717	1.980	1.355	0.98360
1120.00	8.9286	12.326	52.834	1.919	1.310	0.98350
1140.00	8.7719	12.152	52.062	1.867	1.279	0.98325
1160.00	8.6207	11.968	51.283	1.815	1.248	0.98300
1180.00	8.4746	11.765	50.553	1.767	1.218	0.98280
1200.00	8.3333	11.490	49.836	1.720	1.184	0.98270
1220.00	8.1967	11.328	49.202	1.679	1.159	0.98250
1240.00	8.0645	11.159	48.557	1.638	1.133	0.98230
1260.00	7.9365	10.927	47.933	1.599	1.105	0.98220
1280.00	7.8125	10.642	47.265	1.557	1.074	0.98215
1300.00	7.6923	10.543	46.710	1.523	1.055	0.98190
1320.00	7.5758	10.364	46.130	1.486	1.032	0.98175
1340.00	7.4627	10.119	45.541	1.452	1.005	0.98170
1360.00	7.3529	9.969	45.024	1.422	0.986	0.98155
1380.00	7.2464	9.725	44.433	1.386	0.960	0.98150
1400.00	7.1429	9.585	43.939	1.358	0.942	0.98135
1420.00	7.0423	9.363	43.390	1.326	0.918	0.98130
1440.00	6.9444	9.239	42.933	1.300	0.902	0.98115
1460.00	6.8493	9.040	42.428	1.271	0.881	0.98110
1480.00	6.7568	8.892	41.920	1.242	0.863	0.98095
1500.00	6.6667	8.705	41.440	1.216	0.844	0.98090
1520.00	6.5789	8.565	40.949	1.189	0.827	0.98075
1540.00	6.4935	8.379	40.467	1.162	0.809	0.98070
1560.00	6.4103	8.266	39.987	1.137	0.793	0.98050
1580.00	6.3291	8.123	39.547	1.113	0.778	0.98040
1600.00	6.2500	7.995	39.090	1.089	0.763	0.98025
1620.00	6.1728	7.905	38.673	1.068	0.750	0.98005
1640.00	6.0976	7.788	38.245	1.046	0.736	0.97990
1660.00	6.0241	7.710	37.814	1.024	0.724	0.97965
1680.00	5.9524	7.580	37.460	1.006	0.712	0.97960
1700.00	5.8824	7.488	37.049	0.985	0.700	0.97940
1720.00	5.8140	7.353	36.661	0.967	0.687	0.97935
1740.00	5.7471	7.277	36.314	0.949	0.676	0.97915
1760.00	5.6818	7.146	35.953	0.931	0.664	0.97910
1780.00	5.6180	7.041	35.565	0.912	0.652	0.97895
1800.00	5.5556	7.012	35.273	0.899	0.646	0.97870
1820.00	5.4945	6.897	34.952	0.883	0.635	0.97865
1840.00	5.4348	6.776	34.612	0.867	0.624	0.97860
1860.00	5.3763	6.681	34.294	0.852	0.614	0.97850
1880.00	5.3191	6.597	33.962	0.837	0.605	0.97835
1900.00	5.2632	6.485	33.642	0.822	0.595	0.97830
1920.00	5.2083	6.369	33.309	0.806	0.584	0.97825
1940.00	5.1546	6.290	33.031	0.794	0.576	0.97815
1960.00	5.1020	6.217	32.726	0.780	0.568	0.97800
1980.00	5.0505	6.113	32.424	0.766	0.559	0.97795
2000.00	5.0000	6.035	32.109	0.752	0.550	0.97780
2020.00	4.9505	5.926	31.791	0.738	0.541	0.97775
2040.00	4.9020	5.897	31.530	0.727	0.535	0.97750

Table 20. Molybdenum.

PAGE 3

WN	WL	N	K	DN	DK	R
2060.00	4.8544	5.797	31.234	0.714	0.526	0.97745
2080.00	4.8077	5.728	30.946	0.702	0.519	0.97730
2100.00	4.7619	5.689	30.701	0.692	0.513	0.97710
2120.00	4.7170	5.600	30.436	0.681	0.506	0.97705
2140.00	4.6729	5.537	30.165	0.669	0.499	0.97690
2160.00	4.6296	5.461	29.898	0.658	0.492	0.97680
2180.00	4.5872	5.415	29.642	0.648	0.485	0.97660
2200.00	4.5455	5.350	29.403	0.638	0.479	0.97650
2220.00	4.5045	5.291	29.147	0.628	0.473	0.97635
2240.00	4.4643	5.247	28.903	0.618	0.468	0.97615
2260.00	4.4248	5.174	28.676	0.609	0.461	0.97610
2280.00	4.3860	5.093	28.426	0.599	0.455	0.97605
2300.00	4.3478	5.064	28.196	0.590	0.450	0.97580
2320.00	4.3103	5.027	27.974	0.582	0.445	0.97560
2340.00	4.2735	4.960	27.762	0.573	0.440	0.97555
2360.00	4.2373	4.906	27.527	0.564	0.434	0.97540
2380.00	4.2017	4.850	27.317	0.556	0.429	0.97530
2400.00	4.1667	4.805	27.107	0.548	0.424	0.97515
2420.00	4.1322	4.735	26.886	0.540	0.418	0.97510
2440.00	4.0984	4.705	26.665	0.532	0.414	0.97485
2460.00	4.0650	4.669	26.483	0.525	0.410	0.97470
2480.00	4.0323	4.605	26.280	0.518	0.405	0.97465
2500.00	4.0000	4.560	26.075	0.510	0.400	0.97450
2520.00	3.9683	4.527	25.875	0.503	0.396	0.97430
2540.00	3.9370	4.467	25.681	0.496	0.391	0.97425
2560.00	3.9063	4.442	25.484	0.489	0.387	0.97400
2580.00	3.8760	4.383	25.293	0.482	0.383	0.97395
2600.00	3.8462	4.359	25.125	0.476	0.379	0.97375
2620.00	3.8168	4.307	24.930	0.470	0.375	0.97365
2640.00	3.7879	4.273	24.759	0.464	0.371	0.97350
2660.00	3.7594	4.226	24.580	0.457	0.367	0.97340
2680.00	3.7313	4.198	24.404	0.451	0.364	0.97320
2700.00	3.7037	4.138	24.209	0.445	0.359	0.97315
2720.00	3.6765	4.128	24.065	0.440	0.357	0.97290
2740.00	3.6496	4.077	23.897	0.434	0.353	0.97285
2760.00	3.6232	4.035	23.731	0.429	0.349	0.97275
2780.00	3.5971	3.995	23.571	0.423	0.346	0.97265
2800.00	3.5714	3.940	23.391	0.417	0.342	0.97260
2820.00	3.5461	3.919	23.240	0.412	0.339	0.97240
2840.00	3.5211	3.869	23.075	0.407	0.335	0.97235
2860.00	3.4965	3.841	22.908	0.401	0.332	0.97215
2880.00	3.4722	3.802	22.751	0.396	0.328	0.97205
2900.00	3.4483	3.766	22.584	0.391	0.325	0.97190
2920.00	3.4247	3.742	22.428	0.386	0.322	0.97170
2940.00	3.4014	3.714	22.264	0.381	0.319	0.97150
2960.00	3.3784	3.675	22.112	0.376	0.316	0.97140
2980.00	3.3557	3.658	21.961	0.372	0.313	0.97115
3000.00	3.3333	3.628	21.814	0.367	0.310	0.97100
3020.00	3.3113	3.589	21.659	0.362	0.307	0.97090
3040.00	3.2895	3.580	21.516	0.358	0.305	0.97060

Table 20. Molybdenum.

PAGE 4

WN	WL	N	K	DN	DK	R
3060.00	3.2680	3.558	21.376	0.354	0.302	0.97040
3080.00	3.2468	3.527	21.231	0.349	0.299	0.97025
3100.00	3.2258	3.509	21.102	0.346	0.297	0.97005
3120.00	3.2051	3.484	20.975	0.342	0.295	0.96990
3140.00	3.1847	3.461	20.834	0.338	0.292	0.96970
3160.00	3.1646	3.444	20.713	0.334	0.290	0.96950
3180.00	3.1447	3.423	20.582	0.331	0.287	0.96930
3200.00	3.1250	3.391	20.452	0.327	0.285	0.96920
3220.00	3.1056	3.363	20.319	0.323	0.282	0.96905
3240.00	3.0864	3.346	20.201	0.319	0.280	0.96885
3260.00	3.0675	3.326	20.073	0.316	0.278	0.96865
3280.00	3.0488	3.296	19.953	0.312	0.276	0.96855
3300.00	3.0303	3.256	19.817	0.308	0.273	0.96850
3320.00	3.0120	3.244	19.700	0.305	0.271	0.96825
3340.00	2.9940	3.220	19.579	0.302	0.269	0.96810
3360.00	2.9762	3.205	19.458	0.299	0.267	0.96785
3380.00	2.9586	3.186	19.337	0.295	0.264	0.96765
3400.00	2.9412	3.156	19.216	0.292	0.262	0.96755
3420.00	2.9240	3.140	19.107	0.289	0.260	0.96735
3440.00	2.9070	3.109	18.986	0.285	0.258	0.96725
3460.00	2.8902	3.098	18.878	0.283	0.256	0.96700
3480.00	2.8736	3.079	18.761	0.280	0.254	0.96680
3500.00	2.8571	3.057	18.651	0.277	0.252	0.96665
3520.00	2.8409	3.040	18.542	0.274	0.250	0.96645
3540.00	2.8249	3.021	18.427	0.271	0.248	0.96625
3560.00	2.8090	2.995	18.321	0.268	0.246	0.96615
3580.00	2.7933	2.977	18.199	0.265	0.244	0.96590
3600.00	2.7778	2.960	18.093	0.262	0.242	0.96570
3620.00	2.7624	2.942	17.983	0.259	0.240	0.96550
3640.00	2.7473	2.923	17.874	0.256	0.239	0.96530
3660.00	2.7322	2.909	17.763	0.254	0.237	0.96505
3680.00	2.7174	2.896	17.658	0.251	0.235	0.96480
3700.00	2.7027	2.884	17.556	0.249	0.233	0.96455
3720.00	2.6882	2.871	17.455	0.246	0.232	0.96430
3740.00	2.6738	2.858	17.352	0.244	0.230	0.96405
3760.00	2.6596	2.848	17.247	0.241	0.228	0.96375
3780.00	2.6455	2.835	17.148	0.239	0.227	0.96350
3800.00	2.6316	2.828	17.053	0.237	0.225	0.96320
3820.00	2.6178	2.816	16.955	0.234	0.224	0.96295
3840.00	2.6042	2.800	16.862	0.232	0.222	0.96275
3860.00	2.5907	2.797	16.772	0.230	0.221	0.96240
3880.00	2.5773	2.791	16.683	0.228	0.220	0.96210
3900.00	2.5641	2.782	16.600	0.226	0.218	0.96185
3920.00	2.5510	2.760	16.512	0.224	0.217	0.96175
3940.00	2.5381	2.748	16.434	0.222	0.215	0.96155
3960.00	2.5253	2.725	16.343	0.220	0.214	0.96145
3980.00	2.5126	2.715	16.268	0.218	0.213	0.96125
4000.00	2.5000	2.693	16.193	0.216	0.211	0.96120
4032.26	2.4800	2.629	16.038	0.212	0.208	0.96135
4065.04	2.4600	2.605	15.891	0.209	0.206	0.96100



WN	WL	N	K	DN	DK	R
4098.36	2.4400	2.530	15.729	0.204	0.202	0.96130
4132.23	2.4200	2.517	15.512	0.200	0.199	0.96045
4166.67	2.4000	2.545	15.341	0.197	0.197	0.95920
4201.68	2.3800	2.531	15.212	0.194	0.195	0.95875
4237.29	2.3600	2.521	15.040	0.190	0.193	0.95800
4273.50	2.3400	2.516	14.904	0.188	0.191	0.95735
4310.35	2.3200	2.500	14.721	0.184	0.188	0.95660
4347.83	2.3000	2.518	14.578	0.181	0.186	0.95550
4385.96	2.2800	2.508	14.415	0.178	0.184	0.95470
4424.78	2.2600	2.536	14.275	0.176	0.182	0.95340
4464.29	2.2400	2.532	14.153	0.174	0.181	0.95270
4504.50	2.2200	2.516	14.014	0.171	0.179	0.95210
4545.45	2.2000	2.495	13.858	0.168	0.176	0.95145
4587.16	2.1800	2.490	13.682	0.165	0.174	0.95035
4629.63	2.1600	2.528	13.544	0.163	0.172	0.94870
4672.90	2.1400	2.506	13.432	0.161	0.170	0.94830
4716.98	2.1200	2.496	13.269	0.158	0.168	0.94730
4761.90	2.1000	2.493	13.128	0.155	0.166	0.94630
4807.69	2.0800	2.488	12.979	0.153	0.164	0.94525
4854.37	2.0600	2.494	12.838	0.150	0.162	0.94400
4901.96	2.0400	2.476	12.703	0.148	0.160	0.94325
4950.50	2.0200	2.474	12.561	0.145	0.158	0.94210
5000.00	2.0000	2.452	12.408	0.143	0.156	0.94125
5050.50	1.9800	2.456	12.250	0.140	0.153	0.93975
5102.04	1.9600	2.456	12.094	0.138	0.151	0.93830
5154.64	1.9400	2.450	11.959	0.135	0.149	0.93715
5208.33	1.9200	2.432	11.795	0.133	0.147	0.93595
5263.16	1.9000	2.439	11.635	0.130	0.145	0.93415
5319.15	1.8800	2.440	11.483	0.128	0.143	0.93250
5376.34	1.8600	2.453	11.317	0.126	0.140	0.93035
5434.78	1.8400	2.457	11.173	0.124	0.138	0.92860
5494.50	1.8200	2.477	10.999	0.121	0.136	0.92600
5555.56	1.8000	2.499	10.880	0.120	0.134	0.92395
5617.98	1.7800	2.492	10.730	0.118	0.132	0.92220
5681.82	1.7600	2.507	10.581	0.116	0.130	0.91980
5747.13	1.7400	2.506	10.442	0.114	0.128	0.91790
5813.95	1.7200	2.515	10.278	0.112	0.126	0.91525
5882.35	1.7000	2.547	10.142	0.110	0.124	0.91230
5952.38	1.6800	2.542	10.008	0.109	0.122	0.91035
6024.10	1.6600	2.544	9.856	0.107	0.120	0.90780
6097.56	1.6400	2.559	9.714	0.105	0.118	0.90495
6172.84	1.6200	2.562	9.572	0.103	0.116	0.90235
6250.00	1.6000	2.565	9.424	0.101	0.114	0.89955
6329.11	1.5800	2.571	9.271	0.099	0.112	0.89645
6410.26	1.5600	2.581	9.116	0.098	0.109	0.89305
6493.51	1.5400	2.601	8.965	0.096	0.107	0.88920
6578.95	1.5200	2.617	8.823	0.094	0.105	0.88560
6666.67	1.5000	2.622	8.677	0.093	0.103	0.88210
6756.76	1.4800	2.635	8.524	0.091	0.101	0.87800
6849.31	1.4600	2.649	8.377	0.090	0.099	0.87385

Table 20. Molybdenum.

WN	WL	N	K	DN	DK	R
6944.44	1.4400	2.663	8.223	0.088	0.096	0.86935
7042.25	1.4200	2.686	8.077	0.086	0.094	0.86450
7142.36	1.4000	2.697	7.928	0.085	0.092	0.85985
7246.38	1.3800	2.722	7.777	0.083	0.090	0.85440
7352.94	1.3600	2.742	7.635	0.082	0.087	0.84920
7462.69	1.3400	2.756	7.489	0.081	0.085	0.84390
7575.76	1.3200	2.773	7.337	0.079	0.083	0.83800
7692.31	1.3000	2.792	7.188	0.078	0.080	0.83190
7812.50	1.2800	2.808	7.034	0.076	0.078	0.82545
7936.51	1.2600	2.835	6.878	0.075	0.075	0.81820
8064.52	1.2400	2.858	6.728	0.073	0.073	0.81105
8196.72	1.2200	2.884	6.571	0.072	0.070	0.80315
8333.33	1.2000	2.914	6.429	0.070	0.068	0.79545
8474.58	1.1800	2.917	6.265	0.069	0.065	0.78750
8620.69	1.1600	2.955	6.088	0.067	0.062	0.77705
8771.93	1.1400	2.997	5.926	0.066	0.060	0.76670
8928.57	1.1200	3.038	5.756	0.064	0.057	0.75555
9090.91	1.1000	3.095	5.594	0.062	0.054	0.74385
9259.26	1.0800	3.144	5.434	0.061	0.051	0.73220
9433.96	1.0600	3.205	5.263	0.059	0.047	0.71905
9615.38	1.0400	3.271	5.102	0.057	0.044	0.70610
9803.92	1.0200	3.348	4.932	0.056	0.041	0.69190
10000.00	1.0000	3.441	4.783	0.054	0.038	0.67860
10204.08	0.9800	3.529	4.638	0.052	0.035	0.66590
10416.67	0.9600	3.621	4.492	0.050	0.032	0.65310
10638.30	0.9400	3.738	4.349	0.048	0.029	0.64040
10869.56	0.9200	3.857	4.232	0.046	0.026	0.63015
11111.11	0.9000	3.976	4.115	0.043	0.024	0.62050
11363.64	0.8800	4.112	4.023	0.041	0.021	0.61330
11627.91	0.8600	4.242	3.948	0.041	0.023	0.60795
11904.76	0.8400	4.368	3.903	0.042	0.025	0.60535
12195.12	0.8200	4.469	3.867	0.042	0.027	0.60355
12500.00	0.8000	4.559	3.823	0.042	0.028	0.60170
12820.51	0.7800	4.656	3.790	0.042	0.029	0.60075
13157.89	0.7600	4.741	3.789	0.042	0.030	0.60120
13513.51	0.7400	4.808	3.786	0.043	0.031	0.60185
13888.89	0.7200	4.861	3.784	0.043	0.032	0.60250
14285.71	0.7000	4.901	3.788	0.043	0.032	0.60330
14705.88	0.6800	4.919	3.787	0.043	0.033	0.60350
15151.51	0.6600	4.939	3.770	0.043	0.033	0.60275
15625.00	0.6400	4.956	3.759	0.043	0.033	0.60235
16129.03	0.6200	4.964	3.741	0.043	0.033	0.60140
16666.67	0.6000	4.981	3.717	0.043	0.033	0.60020
17241.38	0.5800	5.010	3.702	0.043	0.034	0.59980
17857.14	0.5600	5.057	3.707	0.043	0.034	0.60085
18518.52	0.5400	5.093	3.781	0.044	0.035	0.60580
19230.77	0.5200	5.042	3.886	0.044	0.034	0.61115
20000.00	0.5000	4.915	3.946	0.044	0.032	0.61310
20833.33	0.4800	4.769	3.940	0.044	0.031	0.61110
21739.13	0.4600	4.632	3.879	0.043	0.029	0.60580

Table 20. Molybdenum.

PAGE 7

WN	WL	N	K	DN	DK	R
22727.27	0.4400	4.531	3.779	0.041	0.028	0.59810
23809.52	0.4200	4.474	3.666	0.040	0.027	0.58970
25000.00	0.4000	4.466	3.561	0.040	0.027	0.58225
26315.79	0.3800	4.507	3.488	0.039	0.028	0.57780
27777.78	0.3600	4.589	3.487	0.040	0.029	0.57905
29411.76	0.3400	4.671	3.584	0.041	0.030	0.58685
31250.00	0.3200	4.738	3.797	0.043	0.030	0.60165
33333.33	0.3000	4.686	4.273	0.045	0.028	0.63140
35714.29	0.2800	4.085	4.802	0.053	0.034	0.66770
38461.54	0.2600	3.219	4.808	0.054	0.040	0.68700
41666.67	0.2400	2.540	4.498	0.048	0.040	0.69165
45241.93	0.2210	1.965	4.088	0.041	0.038	0.69345
46854.84	0.2134	1.772	3.822	0.037	0.036	0.68370
48467.74	0.2063	1.664	3.595	0.035	0.033	0.66930

#### 4.17 Zirconium (Zr)

A 12.7 mm dia. x 1 cm long rod of 99.99% pure zirconium was obtained from Aesar/Johnson-Matthey. The material was polycrystalline and the sample was polished and reflectance spectra were acquired in a manner similar to that described for molybdenum in Section 4.16. This sample was very difficult to polish, we never achieved the surface finish desired for the reflectance measurements.

We compared our reflectance spectrum  $R$  of Zr with that  $R_0$  of Weaver et al.<sup>17</sup> (Fig. 39, p. 109) by use of the equation

$$R_0 = R \exp(4\pi\sigma/\lambda)^2,$$

where  $\sigma$  represents the mean surface roughness and  $\lambda$  the wavelength of the incident radiant flux. In the wavelength region  $0.565 < \lambda < 2.5 \mu\text{m}$  we found that  $\sigma = 0.02535 \pm 0.0020 \mu\text{m}$  provided an excellent fit of our reflectance spectrum of Zr to that of Weaver et al. We therefore applied this exponential factor to our reflectance spectrum throughout the 0.57-55.5  $\mu\text{m}$  wavelength region and then used the Weaver et al. reflectance spectrum for the 41-570 nm wavelength region.

Kramers-Kronig methods were then used to determine the complex refractive indices of zirconium from the "corrected" reflectance spectrum. The reflectance spectra and values for  $n$  and  $k$  are presented in Figs. 36 and 37 and in Table 21.

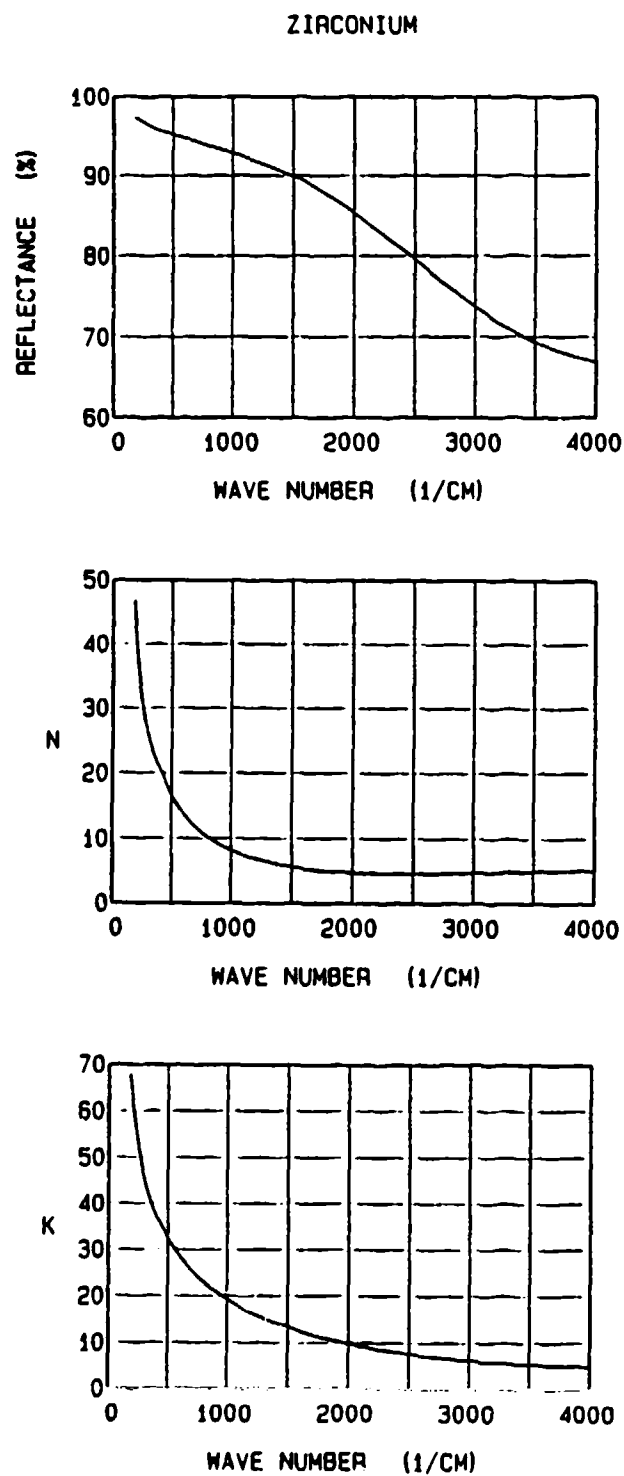


Figure 36. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of zirconium.

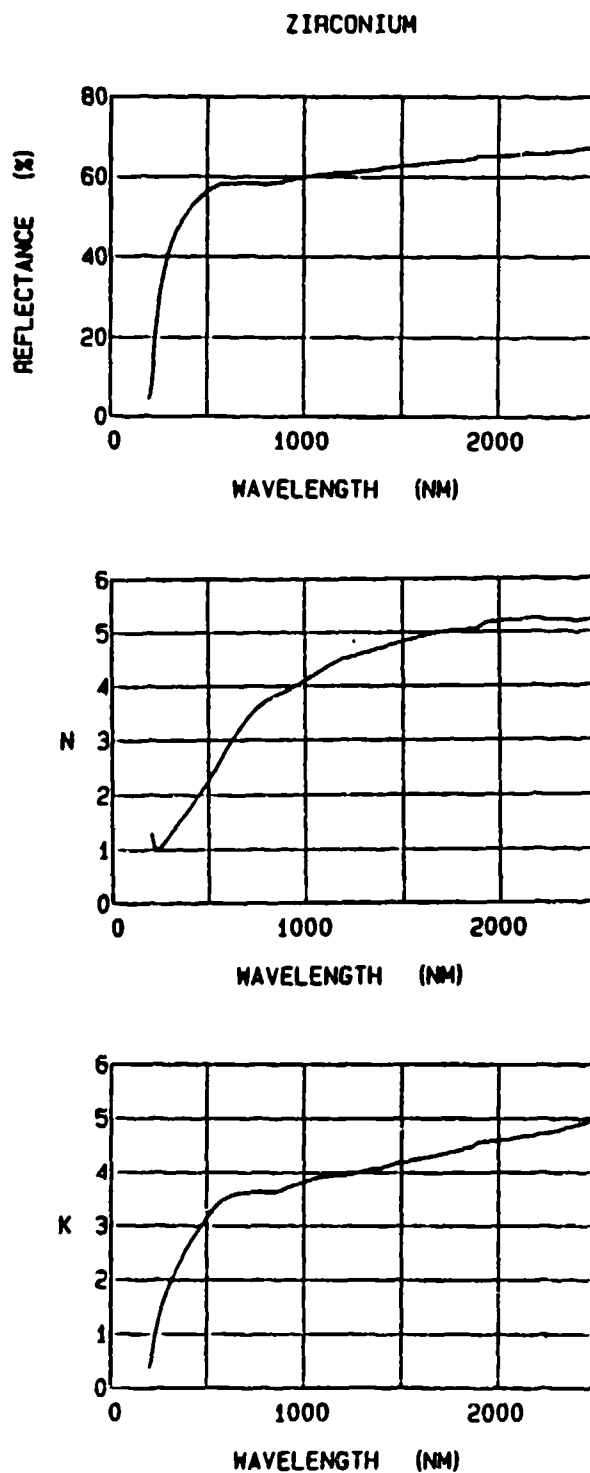


Figure 37. The uv-vis-nir (200-2,500 nm) reflectance, refractive index N, and extinction coefficient K spectra of zirconium .

Table 21. Zirconium.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	46.731	67.736	69.759	28.205	0.97295
200.00	50.0000	39.980	62.499	55.667	26.749	0.97155
220.00	45.4545	35.375	58.200	45.930	24.625	0.97015
240.00	41.6667	31.972	54.228	38.711	22.062	0.96845
260.00	38.4615	29.442	50.816	33.422	19.700	0.96665
280.00	35.7143	27.455	47.998	29.449	17.785	0.96495
300.00	33.3333	25.820	45.534	26.280	16.131	0.96325
320.00	31.2500	24.459	43.439	23.755	14.773	0.96165
340.00	29.4118	23.283	41.521	21.617	13.546	0.96000
360.00	27.7778	22.327	39.897	19.920	12.530	0.95845
380.00	26.3158	21.445	38.482	18.457	11.700	0.95705
400.00	25.0000	20.688	37.284	17.254	11.023	0.95580
420.00	23.8095	20.031	36.348	16.290	10.535	0.95485
440.00	22.7273	18.944	35.431	15.030	10.247	0.95445
460.00	21.7391	18.038	34.513	13.950	9.883	0.95385
480.00	20.8333	17.198	33.469	12.905	9.403	0.95290
500.00	20.0000	16.515	32.549	12.056	8.967	0.95195
520.00	19.2308	15.920	31.621	11.293	8.505	0.95080
540.00	18.5185	15.347	30.829	10.618	8.141	0.94990
560.00	17.8571	14.769	30.059	9.967	7.802	0.94905
580.00	17.2414	14.266	29.301	9.388	7.453	0.94805
600.00	16.6667	13.803	28.636	8.879	7.159	0.94720
620.00	16.1290	13.352	27.954	8.387	6.858	0.94625
640.00	15.6250	12.929	27.320	7.940	6.583	0.94535
660.00	15.1515	12.516	26.686	7.510	6.312	0.94440
680.00	14.7059	12.166	26.097	7.141	6.056	0.94340
700.00	14.2857	11.814	25.545	6.789	5.826	0.94250
720.00	13.8889	11.515	25.016	6.481	5.601	0.94150
740.00	13.5135	11.205	24.500	6.178	5.390	0.94055
760.00	13.1579	10.911	24.042	5.905	5.210	0.93975
780.00	12.8205	10.619	23.577	5.638	5.029	0.93890
800.00	12.5000	10.335	23.123	5.382	4.855	0.93805
820.00	12.1951	10.079	22.688	5.152	4.687	0.93715
840.00	11.9048	9.831	22.265	4.932	4.527	0.93625
860.00	11.6279	9.595	21.856	4.726	4.374	0.93535
880.00	11.3636	9.369	21.473	4.536	4.234	0.93450
900.00	11.1111	9.136	21.086	4.344	4.095	0.93365
920.00	10.8696	8.937	20.716	4.175	3.960	0.93270
940.00	10.6383	8.732	20.344	4.007	3.828	0.93175
960.00	10.4167	8.546	19.986	3.853	3.701	0.93075
980.00	10.2041	8.370	19.660	3.713	3.588	0.92985
1000.00	10.0000	8.201	19.327	3.577	3.473	0.92885
1020.00	9.8039	8.025	18.992	3.440	3.359	0.92785
1040.00	9.6154	7.864	18.676	3.316	3.253	0.92685
1060.00	9.4340	7.721	18.366	3.201	3.149	0.92575
1080.00	9.2593	7.584	18.059	3.092	3.046	0.92460
1100.00	9.0909	7.455	17.774	2.992	2.953	0.92350
1120.00	8.9286	7.317	17.476	2.888	2.857	0.92235
1140.00	8.7719	7.218	17.195	2.802	2.763	0.92100
1160.00	8.6207	7.115	16.929	2.720	2.678	0.91975

Table 21. Zirconium.

PAGE 2

WN	WL	N	K	DN	DK	R
1180.00	8.4746	7.018	16.674	2.643	2.597	0.91850
1200.00	8.3333	6.924	16.439	2.570	2.524	0.91735
1220.00	8.1967	6.819	16.197	2.494	2.451	0.91620
1240.00	8.0645	6.720	15.970	2.423	2.383	0.91510
1260.00	7.9365	6.632	15.735	2.357	2.313	0.91380
1280.00	7.8125	6.550	15.527	2.297	2.252	0.91265
1300.00	7.6923	6.456	15.310	2.232	2.190	0.91150
1320.00	7.5758	6.383	15.092	2.175	2.126	0.91010
1340.00	7.4627	6.309	14.911	2.125	2.075	0.90905
1360.00	7.3529	6.213	14.727	2.067	2.027	0.90815
1380.00	7.2464	6.127	14.539	2.012	1.977	0.90710
1400.00	7.1429	6.035	14.344	1.956	1.925	0.90600
1420.00	7.0423	5.952	14.150	1.903	1.874	0.90480
1440.00	6.9444	5.887	13.963	1.857	1.824	0.90345
1460.00	6.8493	5.802	13.787	1.807	1.780	0.90240
1480.00	6.7568	5.732	13.596	1.760	1.730	0.90100
1500.00	6.6667	5.661	13.416	1.716	1.684	0.89970
1520.00	6.5789	5.595	13.237	1.673	1.639	0.89830
1540.00	6.4935	5.532	13.060	1.632	1.594	0.89685
1560.00	6.4103	5.470	12.889	1.593	1.552	0.89545
1580.00	6.3291	5.410	12.714	1.554	1.509	0.89390
1600.00	6.2500	5.360	12.543	1.518	1.466	0.89225
1620.00	6.1728	5.310	12.376	1.484	1.426	0.89060
1640.00	6.0976	5.271	12.212	1.454	1.385	0.88880
1660.00	6.0241	5.230	12.057	1.424	1.348	0.88710
1680.00	5.9524	5.183	11.902	1.393	1.311	0.88545
1700.00	5.8824	5.151	11.746	1.366	1.274	0.88350
1720.00	5.8140	5.115	11.595	1.339	1.238	0.88165
1740.00	5.7471	5.089	11.453	1.315	1.205	0.87975
1760.00	5.6818	5.051	11.320	1.290	1.175	0.87810
1780.00	5.6180	5.024	11.177	1.267	1.142	0.87610
1800.00	5.5556	5.001	11.042	1.245	1.111	0.87410
1820.00	5.4945	4.961	10.917	1.221	1.085	0.87250
1840.00	5.4348	4.929	10.779	1.198	1.055	0.87050
1860.00	5.3763	4.910	10.641	1.178	1.024	0.86825
1880.00	5.3191	4.889	10.514	1.159	0.996	0.86615
1900.00	5.2632	4.873	10.388	1.141	0.968	0.86395
1920.00	5.2083	4.856	10.277	1.124	0.944	0.86200
1940.00	5.1546	4.837	10.152	1.106	0.918	0.85975
1960.00	5.1020	4.825	10.039	1.091	0.894	0.85760
1980.00	5.0505	4.804	9.932	1.074	0.872	0.85565
2000.00	5.0000	4.788	9.819	1.058	0.849	0.85345
2020.00	4.9505	4.772	9.708	1.043	0.826	0.85125
2040.00	4.9020	4.758	9.599	1.028	0.804	0.84900
2060.00	4.8544	4.748	9.490	1.014	0.782	0.84665
2080.00	4.8077	4.740	9.386	1.000	0.761	0.84430
2100.00	4.7619	4.733	9.285	0.988	0.741	0.84195
2120.00	4.7170	4.726	9.187	0.976	0.721	0.83965
2140.00	4.6729	4.723	9.093	0.965	0.702	0.83730
2160.00	4.6296	4.718	9.000	0.954	0.684	0.83500



Table 21. Zirconium.

PAGE 3

WN	WL	N	K	DN	DK	R
2180.00	4.5872	4.711	8.912	0.943	0.667	0.83280
2200.00	4.5455	4.705	8.826	0.933	0.651	0.83060
2220.00	4.5045	4.697	8.744	0.922	0.636	0.82850
2240.00	4.4643	4.684	8.660	0.911	0.621	0.82640
2260.00	4.4248	4.677	8.573	0.900	0.605	0.82410
2280.00	4.3860	4.670	8.491	0.890	0.590	0.82185
2300.00	4.3478	4.663	8.408	0.879	0.575	0.81955
2320.00	4.3103	4.656	8.324	0.869	0.560	0.81720
2340.00	4.2735	4.654	8.245	0.860	0.546	0.81485
2360.00	4.2373	4.646	8.166	0.851	0.532	0.81255
2380.00	4.2017	4.642	8.090	0.842	0.518	0.81025
2400.00	4.1667	4.634	8.012	0.832	0.505	0.80790
2420.00	4.1322	4.634	7.936	0.824	0.492	0.80545
2440.00	4.0984	4.629	7.860	0.815	0.479	0.80305
2460.00	4.0650	4.627	7.784	0.806	0.466	0.80055
2480.00	4.0323	4.630	7.711	0.799	0.453	0.79800
2500.00	4.0000	4.630	7.642	0.792	0.441	0.79565
2520.00	3.9683	4.628	7.573	0.784	0.429	0.79325
2540.00	3.9370	4.628	7.502	0.777	0.418	0.79075
2560.00	3.9063	4.630	7.433	0.770	0.406	0.78820
2580.00	3.8760	4.633	7.366	0.763	0.394	0.78570
2600.00	3.8462	4.636	7.301	0.756	0.384	0.78325
2620.00	3.8168	4.639	7.236	0.750	0.373	0.78075
2640.00	3.7879	4.647	7.174	0.745	0.362	0.77825
2660.00	3.7594	4.651	7.115	0.739	0.352	0.77595
2680.00	3.7313	4.654	7.056	0.733	0.343	0.77360
2700.00	3.7037	4.657	6.996	0.727	0.333	0.77120
2720.00	3.6765	4.664	6.938	0.722	0.323	0.76875
2740.00	3.6496	4.669	6.883	0.717	0.314	0.76645
2760.00	3.6232	4.674	6.827	0.712	0.305	0.76410
2780.00	3.5971	4.680	6.774	0.707	0.297	0.76180
2800.00	3.5714	4.686	6.721	0.702	0.288	0.75950
2820.00	3.5461	4.693	6.670	0.698	0.280	0.75725
2840.00	3.5211	4.697	6.619	0.693	0.272	0.75505
2860.00	3.4965	4.701	6.568	0.687	0.264	0.75280
2880.00	3.4722	4.710	6.518	0.684	0.256	0.75050
2900.00	3.4483	4.715	6.473	0.679	0.249	0.74845
2920.00	3.4247	4.720	6.423	0.675	0.241	0.74620
2940.00	3.4014	4.728	6.377	0.671	0.234	0.74405
2960.00	3.3784	4.733	6.332	0.667	0.227	0.74195
2980.00	3.3557	4.739	6.286	0.663	0.219	0.73980
3000.00	3.3333	4.744	6.242	0.659	0.213	0.73775
3020.00	3.3113	4.749	6.194	0.654	0.206	0.73550
3040.00	3.2895	4.758	6.150	0.651	0.199	0.73335
3060.00	3.2680	4.766	6.108	0.647	0.192	0.73130
3080.00	3.2468	4.774	6.064	0.643	0.185	0.72915
3100.00	3.2258	4.784	6.022	0.640	0.179	0.72705
3120.00	3.2051	4.793	5.983	0.637	0.173	0.72510
3140.00	3.1847	4.802	5.945	0.634	0.166	0.72315
3160.00	3.1646	4.811	5.907	0.631	0.161	0.72125

Table 21. Zirconium.

PAGE 4

WN	WL	N	K	DN	DK	R
3180.00	3.1447	4.821	5.867	0.628	0.154	0.71920
3200.00	3.1250	4.831	5.832	0.625	0.149	0.71745
3220.00	3.1056	4.839	5.795	0.622	0.143	0.71555
3240.00	3.0864	4.850	5.759	0.619	0.137	0.71370
3260.00	3.0675	4.860	5.726	0.617	0.132	0.71195
3280.00	3.0488	4.869	5.693	0.614	0.127	0.71025
3300.00	3.0303	4.880	5.659	0.612	0.121	0.70850
3320.00	3.0120	4.888	5.628	0.609	0.117	0.70690
3340.00	2.9940	4.898	5.596	0.607	0.112	0.70520
3360.00	2.9762	4.909	5.564	0.605	0.106	0.70355
3380.00	2.9586	4.921	5.534	0.603	0.102	0.70195
3400.00	2.9412	4.930	5.506	0.601	0.097	0.70045
3420.00	2.9240	4.943	5.478	0.599	0.092	0.69895
3440.00	2.9070	4.954	5.451	0.597	0.088	0.69755
3460.00	2.8902	4.964	5.427	0.596	0.084	0.69625
3480.00	2.8736	4.974	5.400	0.594	0.079	0.69485
3500.00	2.8571	4.983	5.377	0.592	0.076	0.69360
3520.00	2.8409	4.993	5.353	0.591	0.072	0.69235
3540.00	2.8249	5.002	5.328	0.589	0.068	0.69105
3560.00	2.8090	5.013	5.308	0.588	0.064	0.68995
3580.00	2.7933	5.022	5.286	0.586	0.061	0.68880
3600.00	2.7778	5.030	5.264	0.585	0.057	0.68765
3620.00	2.7624	5.038	5.246	0.584	0.054	0.68670
3640.00	2.7473	5.045	5.227	0.582	0.051	0.68570
3660.00	2.7322	5.052	5.206	0.581	0.048	0.68460
3680.00	2.7174	5.058	5.188	0.579	0.045	0.68365
3700.00	2.7027	5.064	5.168	0.577	0.042	0.68260
3720.00	2.6882	5.070	5.149	0.576	0.039	0.68160
3740.00	2.6738	5.075	5.129	0.574	0.037	0.68055
3760.00	2.6596	5.080	5.109	0.572	0.034	0.67950
3780.00	2.6455	5.087	5.089	0.571	0.031	0.67845
3800.00	2.6316	5.092	5.069	0.569	0.028	0.67740
3820.00	2.6178	5.101	5.047	0.567	0.024	0.67625
3840.00	2.6042	5.110	5.028	0.566	0.021	0.67525
3860.00	2.5907	5.120	5.009	0.565	0.021	0.67430
3880.00	2.5773	5.131	4.992	0.565	0.024	0.67340
3900.00	2.5641	5.142	4.977	0.564	0.027	0.67260
3920.00	2.5510	5.153	4.962	0.564	0.030	0.67185
3940.00	2.5381	5.165	4.948	0.564	0.033	0.67110
3960.00	2.5253	5.176	4.936	0.563	0.035	0.67050
3980.00	2.5126	5.189	4.924	0.564	0.038	0.66990
4000.00	2.5000	5.207	4.915	0.565	0.041	0.66950
4032.26	2.4800	5.209	4.937	0.567	0.039	0.67060
4065.04	2.4600	5.195	4.912	0.563	0.040	0.66930
4098.36	2.4400	5.203	4.896	0.562	0.042	0.66850
4132.23	2.4200	5.196	4.880	0.560	0.043	0.66765
4166.67	2.4000	5.200	4.853	0.557	0.047	0.66625
4201.68	2.3800	5.204	4.830	0.555	0.049	0.66505
4237.29	2.3600	5.212	4.820	0.555	0.051	0.66455
4273.50	2.3400	5.205	4.796	0.551	0.053	0.66325

WN	WL	N	K	DN	DK	R
4310.35	2.3200	5.212	4.778	0.550	0.056	0.66235
4347.83	2.3000	5.221	4.762	0.549	0.059	0.66150
4385.96	2.2800	5.224	4.739	0.547	0.061	0.66030
4424.78	2.2600	5.231	4.724	0.546	0.064	0.65955
4464.29	2.2400	5.239	4.707	0.545	0.066	0.65870
4504.50	2.2200	5.239	4.702	0.545	0.067	0.65845
4545.45	2.2000	5.241	4.693	0.544	0.068	0.65795
4587.16	2.1800	5.236	4.679	0.542	0.069	0.65720
4629.63	2.1600	5.240	4.666	0.541	0.071	0.65655
4672.90	2.1400	5.241	4.667	0.541	0.071	0.65660
4716.98	2.1200	5.223	4.655	0.537	0.070	0.65585
4761.90	2.1000	5.217	4.637	0.535	0.071	0.65490
4807.69	2.0800	5.210	4.618	0.532	0.072	0.65385
4854.37	2.0600	5.212	4.606	0.531	0.073	0.65320
4901.96	2.0400	5.207	4.597	0.529	0.074	0.65270
4950.50	2.0200	5.209	4.584	0.528	0.075	0.65200
5000.00	2.0000	5.183	4.586	0.526	0.072	0.65195
5050.50	1.9800	5.194	4.573	0.525	0.074	0.65135
5102.04	1.9600	5.174	4.573	0.523	0.072	0.65120
5154.64	1.9400	5.162	4.565	0.521	0.071	0.65070
5208.33	1.9200	5.126	4.572	0.518	0.066	0.65090
5263.16	1.9000	5.097	4.559	0.514	0.064	0.65005
5319.15	1.8800	5.050	4.521	0.505	0.063	0.64770
5376.34	1.8600	5.055	4.466	0.499	0.069	0.64465
5434.78	1.8400	5.047	4.462	0.498	0.068	0.64435
5494.50	1.8200	5.025	4.433	0.493	0.068	0.64260
5555.56	1.8000	5.030	4.393	0.489	0.073	0.64035
5617.98	1.7800	5.027	4.387	0.488	0.073	0.64000
5681.82	1.7600	5.016	4.371	0.485	0.073	0.63900
5747.13	1.7400	5.003	4.357	0.482	0.073	0.63815
5813.95	1.7200	4.997	4.332	0.479	0.075	0.63665
5882.35	1.7000	4.983	4.328	0.477	0.073	0.63635
5952.38	1.6800	4.970	4.311	0.474	0.074	0.63525
6024.10	1.6600	4.958	4.292	0.471	0.074	0.63405
6097.56	1.6400	4.950	4.282	0.469	0.074	0.63340
6172.84	1.6200	4.933	4.278	0.467	0.072	0.63305
6250.00	1.6000	4.914	4.253	0.463	0.073	0.63145
6329.11	1.5800	4.896	4.236	0.459	0.072	0.63045
6410.26	1.5600	4.878	4.229	0.456	0.071	0.62975
6493.51	1.5400	4.846	4.203	0.451	0.070	0.62800
6578.95	1.5200	4.846	4.192	0.450	0.071	0.62730
6666.67	1.5000	4.819	4.182	0.446	0.069	0.62650
6756.76	1.4800	4.800	4.166	0.443	0.068	0.62540
6849.31	1.4600	4.777	4.150	0.439	0.067	0.62425
6944.44	1.4400	4.754	4.128	0.434	0.066	0.62275
7042.25	1.4200	4.734	4.113	0.431	0.065	0.62165
7142.86	1.4000	4.704	4.091	0.426	0.064	0.62005
7246.38	1.3800	4.697	4.074	0.423	0.065	0.61890
7352.94	1.3600	4.680	4.065	0.421	0.064	0.61820
7462.69	1.3400	4.649	4.049	0.417	0.062	0.61700

WN	WL	N	K	DN	DK	R
7575.76	1.3200	4.627	4.023	0.412	0.062	0.61515
7692.31	1.3000	4.603	4.009	0.408	0.061	0.61405
7812.50	1.2800	4.581	4.000	0.405	0.059	0.61330
7936.51	1.2600	4.558	3.980	0.401	0.058	0.61180
8064.52	1.2400	4.539	3.959	0.398	0.058	0.61025
8196.72	1.2200	4.515	3.942	0.394	0.057	0.60900
8333.33	1.2000	4.510	3.936	0.393	0.057	0.60855
8474.58	1.1800	4.475	3.940	0.390	0.053	0.60855
8620.69	1.1600	4.443	3.934	0.387	0.050	0.60795
8771.93	1.1400	4.402	3.931	0.383	0.047	0.60745
8928.57	1.1200	4.365	3.921	0.378	0.044	0.60655
9090.91	1.1000	4.319	3.911	0.373	0.040	0.60565
9259.26	1.0800	4.275	3.900	0.368	0.037	0.60460
9433.96	1.0600	4.226	3.880	0.362	0.034	0.60295
9615.38	1.0400	4.179	3.852	0.355	0.031	0.60075
9803.92	1.0200	4.138	3.831	0.350	0.029	0.59900
10000.00	1.0000	4.098	3.804	0.344	0.028	0.59690
10204.08	0.9800	4.061	3.790	0.340	0.026	0.59570
10416.67	0.9600	4.016	3.761	0.333	0.024	0.59330
10638.30	0.9400	3.970	3.736	0.327	0.022	0.59125
10869.56	0.9200	3.931	3.714	0.322	0.020	0.58940
11111.11	0.9000	3.888	3.685	0.316	0.018	0.58700
11363.64	0.8800	3.856	3.653	0.311	0.018	0.58435
11627.91	0.8600	3.830	3.630	0.307	0.017	0.58240
11904.76	0.8400	3.801	3.627	0.304	0.015	0.58210
12195.12	0.8200	3.760	3.619	0.300	0.012	0.58145
12500.00	0.8000	3.724	3.627	0.298	0.015	0.58210
12820.51	0.7800	3.660	3.631	0.293	0.020	0.58255
13157.89	0.7600	3.595	3.630	0.288	0.025	0.58270
13513.51	0.7400	3.526	3.628	0.283	0.030	0.58290
13888.89	0.7200	3.448	3.623	0.276	0.036	0.58300
14285.71	0.7000	3.364	3.616	0.269	0.041	0.58310
14705.88	0.6800	3.274	3.603	0.261	0.046	0.58295
15151.51	0.6600	3.179	3.586	0.253	0.051	0.58275
15625.00	0.6400	3.078	3.566	0.244	0.056	0.58255
16129.03	0.6200	2.968	3.537	0.233	0.061	0.58195
16666.67	0.6000	2.857	3.503	0.223	0.065	0.58115
17241.38	0.5800	2.731	3.466	0.211	0.070	0.58085
17857.14	0.5600	2.593	3.401	0.197	0.072	0.57830
18518.52	0.5400	2.470	3.319	0.183	0.072	0.57355
19230.77	0.5200	2.356	3.228	0.170	0.072	0.56745
20000.00	0.5000	2.245	3.138	0.158	0.070	0.56145
20933.33	0.4800	2.134	3.033	0.145	0.068	0.55350
21739.13	0.4600	2.034	2.926	0.134	0.065	0.54430
22727.27	0.4400	1.935	2.817	0.123	0.062	0.53465
23809.52	0.4200	1.836	2.708	0.112	0.060	0.52465
25000.00	0.4000	1.734	2.579	0.101	0.056	0.51130
26315.79	0.3800	1.636	2.452	0.091	0.052	0.49740
27777.78	0.3600	1.550	2.308	0.081	0.047	0.47840
29411.76	0.3400	1.452	2.174	0.072	0.043	0.46170

Table 21. Zirconium.

PAGE 7

WN	WL	N	K	DN	DK	R
31250.00	0.3200	1.360	2.009	0.062	0.038	0.43620
33333.33	0.3000	1.271	1.845	0.053	0.034	0.40890
35714.29	0.2800	1.178	1.651	0.044	0.028	0.37180
38461.54	0.2600	1.091	1.433	0.036	0.023	0.32355
41666.67	0.2400	0.995	1.145	0.026	0.017	0.25045
45454.55	0.2200	1.007	0.697	0.017	0.009	0.10955

#### 4.18 Manganese (Mn).

Manganese was acquired from Aesar/Johnson-Matthey as 99.995% pure pieces, 25 mm + down in size. One piece, approximately 15 mm dia. and 1 mm thick was potted in resin and then mechanically polished in a manner similar to that described in Section 4.16 for molybdenum. The reflectance spectrum was then acquired throughout the 180-45,500  $\text{cm}^{-1}$  wave-number region. In the visible spectral region the reflectance was in excellent agreement with a reflectance spectrum computed for manganese from  $n, k$  values previously published by Johnson and Christy.<sup>18</sup> In the ultraviolet region our reflectance spectrum of manganese was higher than that of Johnson and Christy. The reflectance spectra also did not agree in the near-infrared region.

A 1939 publication by Sabine<sup>19</sup> was the only other spectrum available with which we could compare our reflectance spectrum for manganese. Sabine stated that the errors in his work may be considerable. A quick comparison of Sabine's reflectance spectrum for manganese with ours showed large differences. Thus there was no far ultraviolet data to join to our reflectance spectrum for the Kramers-Kronig analysis. We did, however, join the far ultraviolet reflectance spectrum of iron<sup>17</sup> to the manganese reflectance spectrum; the two spectra had the same feature and the same general slope in the near ultraviolet, and iron has only one more electron than manganese. The Kramers-Kronig analysis was performed on this spectrum with an additional extrapolation of

$R=R_0(\nu_0/\nu)^\beta$ , where  $R_0$  was the reflectance at the far ultraviolet cutoff  $\nu_0$ ,  $R$  was the reflectance at frequency  $\nu$ , and  $\beta$  was an adjustable parameter. A value of  $\beta=3.1$  gave the best agreement that we could obtain with the values of  $n$  and  $k$  for manganese as previously determined by Johnson and Christy.

The reflectance spectrum and resultant values of  $n$  and  $k$  are presented in Figures 38 and 39 and Table 22.

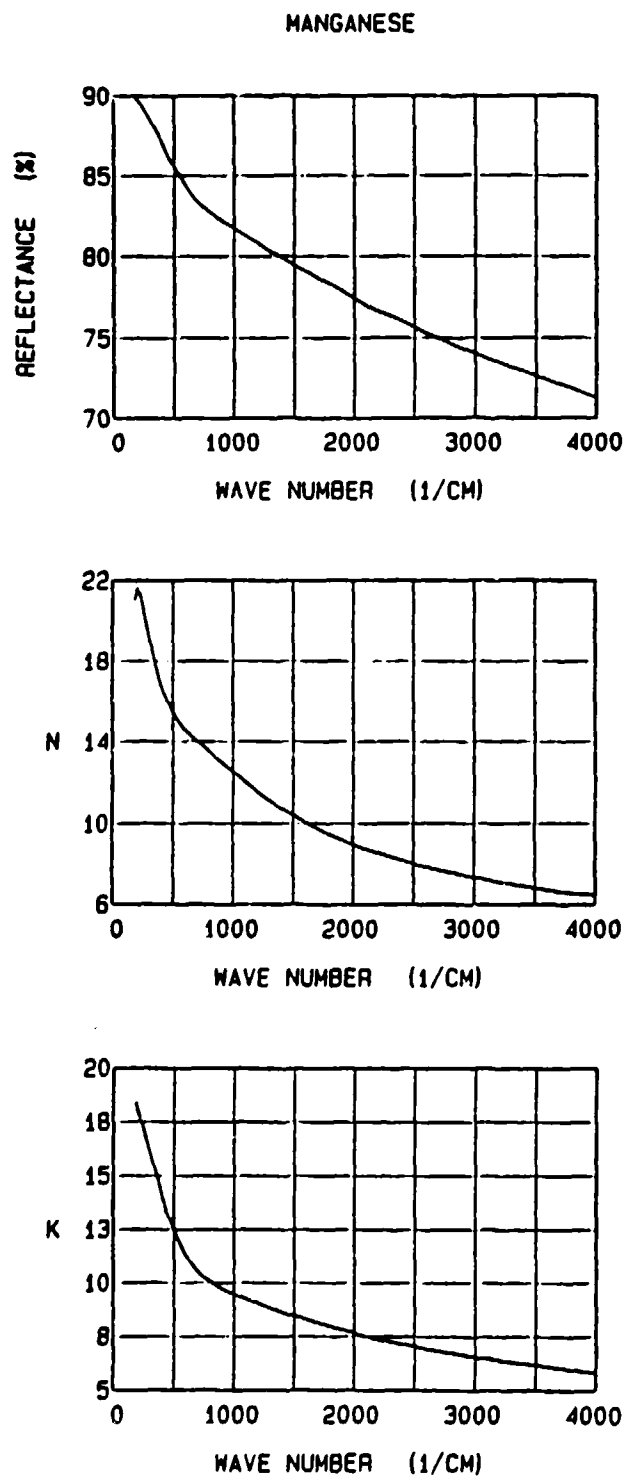


Figure 38. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of manganese .



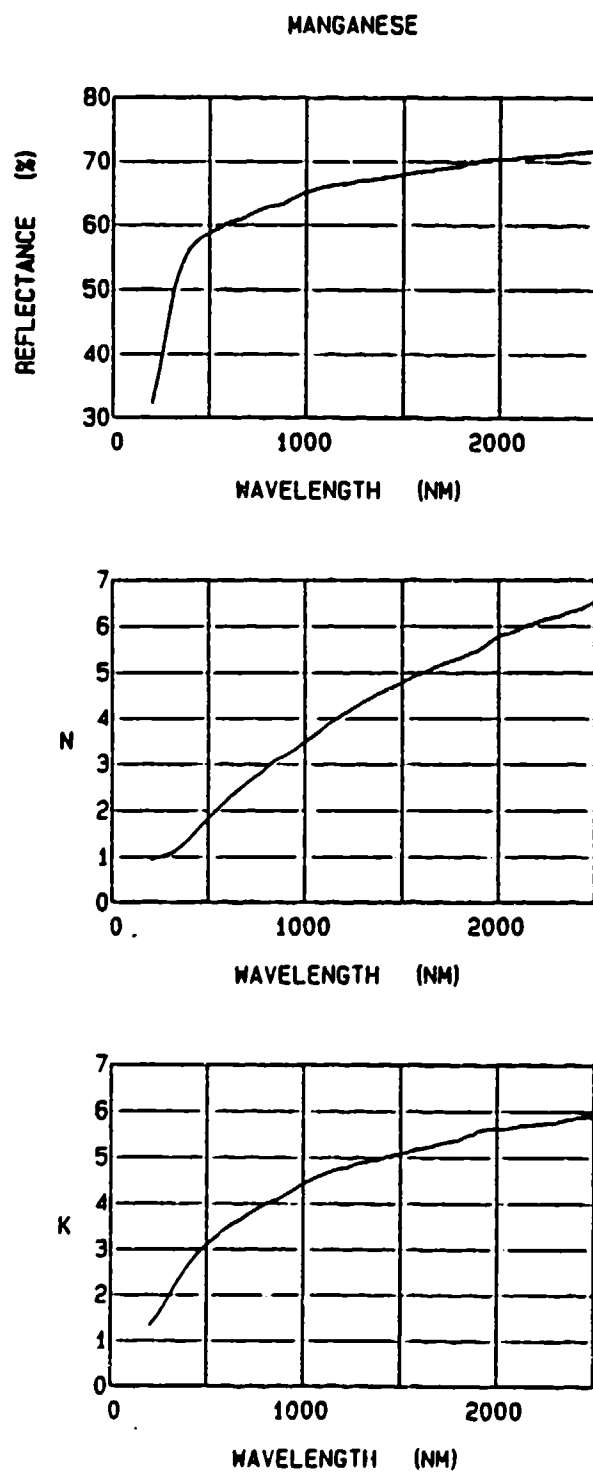


Figure 39. The uv-vis-nir (200-2,500 nm) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of manganese .

Table 22. Manganese.

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	21.069	18.390	7.021	1.255	0.89850
200.00	50.0000	21.611	17.981	7.018	1.504	0.89705
220.00	45.4545	21.347	17.619	6.793	1.509	0.89520
240.00	41.6667	20.879	17.215	6.492	1.449	0.89290
260.00	38.4615	20.304	16.823	6.168	1.347	0.89045
280.00	35.7143	19.770	16.406	5.857	1.269	0.88780
300.00	33.3333	19.208	16.018	5.555	1.177	0.88515
320.00	31.2500	18.674	15.646	5.275	1.092	0.88250
340.00	29.4118	18.153	15.293	5.011	1.010	0.87985
360.00	27.7778	17.651	14.892	4.744	0.950	0.87680
380.00	26.3158	17.206	14.483	4.498	0.911	0.87360
400.00	25.0000	16.804	14.056	4.264	0.891	0.87015
420.00	23.8095	16.462	13.676	4.066	0.877	0.86695
440.00	22.7273	16.197	13.256	3.879	0.895	0.86340
460.00	21.7391	15.949	12.998	3.746	0.880	0.86100
480.00	20.8333	15.686	12.712	3.604	0.867	0.85825
500.00	20.0000	15.455	12.430	3.473	0.863	0.85550
520.00	19.2308	15.246	12.156	3.352	0.862	0.85275
540.00	18.5185	15.064	11.925	3.250	0.859	0.85035
560.00	17.8571	14.888	11.690	3.149	0.858	0.84785
580.00	17.2414	14.719	11.478	3.058	0.855	0.84550
600.00	16.6667	14.574	11.266	2.973	0.857	0.84315
620.00	16.1290	14.434	11.085	2.898	0.855	0.84105
640.00	15.6250	14.307	10.901	2.825	0.856	0.83890
660.00	15.1515	14.200	10.736	2.763	0.859	0.83695
680.00	14.7059	14.104	10.597	2.709	0.860	0.83525
700.00	14.2857	14.023	10.470	2.662	0.862	0.83370
720.00	13.8889	13.934	10.367	2.619	0.857	0.83235
740.00	13.5135	13.839	10.268	2.577	0.851	0.83100
760.00	13.1579	13.746	10.207	2.544	0.838	0.83005
780.00	12.8205	13.637	10.134	2.506	0.823	0.82890
800.00	12.5000	13.520	10.065	2.467	0.806	0.82775
820.00	12.1951	13.404	9.983	2.426	0.792	0.82645
840.00	11.9048	13.295	9.914	2.390	0.777	0.82530
860.00	11.6279	13.197	9.843	2.355	0.765	0.82415
880.00	11.3636	13.103	9.772	2.322	0.754	0.82300
900.00	11.1111	13.018	9.717	2.294	0.743	0.82205
920.00	10.8696	12.915	9.667	2.264	0.727	0.82110
940.00	10.6383	12.814	9.618	2.234	0.711	0.82015
960.00	10.4167	12.722	9.571	2.207	0.697	0.81925
980.00	10.2041	12.615	9.521	2.177	0.680	0.81825
1000.00	10.0000	12.524	9.475	2.151	0.667	0.81735
1020.00	9.8039	12.421	9.430	2.123	0.651	0.81640
1040.00	9.6154	12.322	9.383	2.095	0.636	0.81545
1060.00	9.4340	12.231	9.351	2.072	0.620	0.81470
1080.00	9.2593	12.130	9.306	2.045	0.605	0.81375
1100.00	9.0909	12.031	9.265	2.019	0.589	0.81285
1120.00	8.9286	11.941	9.219	1.994	0.577	0.81190
1140.00	8.7719	11.851	9.188	1.972	0.562	0.81115
1160.00	8.6207	11.760	9.143	1.947	0.550	0.81020

Table 22. Manganese.

PAGE 2

WN	WL	N	K	DN	DK	R
1180.00	8.4746	11.666	9.113	1.925	0.534	0.80945
1200.00	8.3333	11.564	9.075	1.900	0.518	0.80855
1220.00	8.1967	11.467	9.020	1.872	0.506	0.80740
1240.00	8.0645	11.382	8.979	1.850	0.495	0.80650
1260.00	7.9365	11.297	8.925	1.825	0.485	0.80540
1280.00	7.8125	11.222	8.880	1.803	0.477	0.80445
1300.00	7.6923	11.141	8.836	1.781	0.467	0.80350
1320.00	7.5758	11.059	8.797	1.760	0.456	0.80260
1340.00	7.4627	10.990	8.764	1.743	0.447	0.80185
1360.00	7.3529	10.907	8.726	1.722	0.436	0.80095
1380.00	7.2464	10.834	8.683	1.702	0.428	0.80000
1400.00	7.1429	10.762	8.643	1.683	0.419	0.79910
1420.00	7.0423	10.683	8.614	1.664	0.408	0.79835
1440.00	6.9444	10.610	8.563	1.643	0.401	0.79725
1460.00	6.8493	10.551	8.522	1.626	0.396	0.79635
1480.00	6.7568	10.485	8.503	1.612	0.386	0.79580
1500.00	6.6667	10.418	8.461	1.594	0.379	0.79485
1520.00	6.5789	10.352	8.434	1.578	0.370	0.79415
1540.00	6.4935	10.279	8.397	1.560	0.362	0.79325
1560.00	6.4103	10.221	8.366	1.546	0.355	0.79250
1580.00	6.3291	10.154	8.329	1.529	0.348	0.79160
1600.00	6.2500	10.094	8.299	1.514	0.341	0.79085
1620.00	6.1728	10.030	8.272	1.500	0.333	0.79015
1640.00	6.0976	9.964	8.244	1.484	0.325	0.78940
1660.00	6.0241	9.899	8.207	1.468	0.318	0.78850
1680.00	5.9524	9.836	8.179	1.453	0.311	0.78775
1700.00	5.8824	9.780	8.141	1.438	0.306	0.78685
1720.00	5.8140	9.723	8.104	1.424	0.301	0.78595
1740.00	5.7471	9.667	8.078	1.411	0.295	0.78525
1760.00	5.6818	9.610	8.049	1.397	0.289	0.78450
1780.00	5.6180	9.555	8.013	1.383	0.284	0.78360
1800.00	5.5556	9.500	7.994	1.372	0.277	0.78305
1820.00	5.4945	9.438	7.970	1.358	0.269	0.78235
1840.00	5.4348	9.385	7.934	1.344	0.265	0.78145
1860.00	5.3763	9.329	7.899	1.330	0.260	0.78055
1880.00	5.3191	9.270	7.865	1.316	0.255	0.77965
1900.00	5.2632	9.220	7.839	1.305	0.250	0.77895
1920.00	5.2083	9.172	7.803	1.292	0.246	0.77805
1940.00	5.1546	9.119	7.769	1.279	0.242	0.77715
1960.00	5.1020	9.067	7.742	1.267	0.237	0.77640
1980.00	5.0505	9.020	7.710	1.255	0.233	0.77555
2000.00	5.0000	8.969	7.676	1.243	0.229	0.77465
2020.00	4.9505	8.925	7.642	1.231	0.227	0.77375
2040.00	4.9020	8.877	7.608	1.219	0.223	0.77285
2060.00	4.8544	8.838	7.574	1.208	0.221	0.77195
2080.00	4.8077	8.793	7.542	1.197	0.218	0.77110
2100.00	4.7619	8.754	7.508	1.186	0.216	0.77020
2120.00	4.7170	8.721	7.474	1.176	0.215	0.76930
2140.00	4.6729	8.690	7.448	1.168	0.214	0.76860
2160.00	4.6296	8.654	7.423	1.159	0.211	0.76790

Table 22. Manganese.

PAGE 3

WN	WL	N	K	DN	DK	R
2180.00	4.5872	8.622	7.398	1.151	0.209	0.76720
2200.00	4.5455	8.582	7.380	1.143	0.205	0.76665
2220.00	4.5045	8.546	7.356	1.134	0.203	0.76595
2240.00	4.4643	8.510	7.340	1.127	0.199	0.76545
2260.00	4.4248	8.477	7.322	1.120	0.196	0.76490
2280.00	4.3860	8.434	7.298	1.111	0.192	0.76420
2300.00	4.3478	8.395	7.281	1.103	0.188	0.76365
2320.00	4.3103	8.355	7.258	1.094	0.185	0.76295
2340.00	4.2735	8.321	7.234	1.086	0.183	0.76225
2360.00	4.2373	8.282	7.211	1.077	0.180	0.76155
2380.00	4.2017	8.244	7.188	1.069	0.177	0.76085
2400.00	4.1667	8.207	7.165	1.061	0.174	0.76015
2420.00	4.1322	8.170	7.150	1.054	0.171	0.75965
2440.00	4.0984	8.132	7.127	1.045	0.168	0.75895
2460.00	4.0650	8.094	7.105	1.037	0.165	0.75825
2480.00	4.0323	8.059	7.074	1.028	0.163	0.75735
2500.00	4.0000	8.022	7.052	1.020	0.160	0.75665
2520.00	3.9683	7.988	7.023	1.012	0.159	0.75580
2540.00	3.9370	7.954	6.994	1.003	0.157	0.75490
2560.00	3.9063	7.928	6.972	0.997	0.156	0.75425
2580.00	3.8760	7.902	6.949	0.990	0.155	0.75355
2600.00	3.8462	7.874	6.927	0.983	0.154	0.75285
2620.00	3.8168	7.849	6.904	0.977	0.153	0.75215
2640.00	3.7879	7.817	6.889	0.971	0.150	0.75165
2660.00	3.7594	7.787	6.867	0.964	0.148	0.75095
2680.00	3.7313	7.757	6.851	0.958	0.146	0.75040
2700.00	3.7037	7.731	6.830	0.952	0.145	0.74975
2720.00	3.6765	7.700	6.809	0.945	0.143	0.74905
2740.00	3.6496	7.671	6.787	0.939	0.141	0.74835
2760.00	3.6232	7.644	6.766	0.932	0.140	0.74765
2780.00	3.5971	7.618	6.744	0.926	0.139	0.74695
2800.00	3.5714	7.593	6.724	0.920	0.138	0.74630
2820.00	3.5461	7.571	6.707	0.915	0.136	0.74575
2840.00	3.5211	7.547	6.693	0.911	0.135	0.74525
2860.00	3.4965	7.520	6.672	0.904	0.133	0.74455
2880.00	3.4722	7.492	6.652	0.898	0.132	0.74390
2900.00	3.4483	7.467	6.636	0.893	0.130	0.74335
2920.00	3.4247	7.441	6.622	0.888	0.128	0.74285
2940.00	3.4014	7.416	6.601	0.882	0.127	0.74215
2960.00	3.3784	7.396	6.587	0.878	0.126	0.74165
2980.00	3.3557	7.369	6.566	0.872	0.125	0.74095
3000.00	3.3333	7.349	6.547	0.867	0.124	0.74030
3020.00	3.3113	7.325	6.533	0.862	0.123	0.73980
3040.00	3.2895	7.300	6.517	0.857	0.121	0.73925
3060.00	3.2680	7.277	6.503	0.853	0.119	0.73875
3080.00	3.2468	7.254	6.485	0.848	0.118	0.73810
3100.00	3.2258	7.228	6.470	0.843	0.117	0.73755
3120.00	3.2051	7.206	6.456	0.838	0.115	0.73705
3140.00	3.1847	7.184	6.442	0.834	0.114	0.73655
3160.00	3.1646	7.161	6.422	0.829	0.113	0.73585

Table 22. Manganese.

PAGE 4

WN	WL	N	K	DN	DK	R
3180.00	3.1447	7.139	6.408	0.824	0.112	0.73535
3200.00	3.1250	7.113	6.390	0.819	0.110	0.73470
3220.00	3.1056	7.094	6.370	0.814	0.110	0.73400
3240.00	3.0864	7.074	6.356	0.810	0.109	0.73350
3260.00	3.0675	7.052	6.343	0.806	0.107	0.73300
3280.00	3.0488	7.033	6.325	0.801	0.107	0.73235
3300.00	3.0303	7.012	6.310	0.797	0.106	0.73180
3320.00	3.0120	6.992	6.296	0.793	0.105	0.73130
3340.00	2.9940	6.974	6.278	0.789	0.104	0.73065
3360.00	2.9762	6.956	6.269	0.786	0.103	0.73030
3380.00	2.9586	6.933	6.256	0.781	0.101	0.72980
3400.00	2.9412	6.913	6.243	0.777	0.100	0.72930
3420.00	2.9240	6.894	6.230	0.774	0.099	0.72880
3440.00	2.9070	6.876	6.210	0.769	0.099	0.72810
3460.00	2.8902	6.860	6.197	0.766	0.098	0.72760
3480.00	2.8736	6.837	6.184	0.762	0.097	0.72710
3500.00	2.8571	6.818	6.171	0.758	0.096	0.72660
3520.00	2.8409	6.796	6.156	0.754	0.095	0.72610
3540.00	2.8249	6.781	6.141	0.750	0.094	0.72545
3560.00	2.8090	6.762	6.128	0.746	0.093	0.72495
3580.00	2.7933	6.742	6.115	0.743	0.092	0.72445
3600.00	2.7778	6.728	6.098	0.739	0.092	0.72380
3620.00	2.7624	6.711	6.089	0.736	0.091	0.72345
3640.00	2.7473	6.691	6.072	0.732	0.091	0.72280
3660.00	2.7322	6.676	6.059	0.729	0.090	0.72230
3680.00	2.7174	6.659	6.047	0.725	0.089	0.72180
3700.00	2.7027	6.642	6.034	0.722	0.089	0.72130
3720.00	2.6882	6.623	6.021	0.718	0.087	0.72080
3740.00	2.6738	6.607	6.003	0.714	0.087	0.72010
3760.00	2.6596	6.595	5.992	0.712	0.087	0.71965
3780.00	2.6455	6.578	5.979	0.708	0.086	0.71915
3800.00	2.6316	6.564	5.967	0.705	0.086	0.71865
3820.00	2.6178	6.549	5.949	0.702	0.086	0.71795
3840.00	2.6042	6.539	5.936	0.699	0.086	0.71745
3860.00	2.5907	6.525	5.919	0.696	0.086	0.71680
3880.00	2.5773	6.514	5.906	0.693	0.086	0.71630
3900.00	2.5641	6.504	5.889	0.690	0.087	0.71565
3920.00	2.5510	6.497	5.877	0.688	0.087	0.71515
3940.00	2.5381	6.494	5.863	0.686	0.088	0.71465
3960.00	2.5253	6.491	5.851	0.684	0.089	0.71420
3980.00	2.5126	6.490	5.842	0.683	0.090	0.71385
4000.00	2.5000	6.503	5.831	0.683	0.092	0.71350
4032.26	2.4800	6.486	5.901	0.689	0.083	0.71600
4065.04	2.4600	6.432	5.883	0.681	0.079	0.71520
4098.36	2.4400	6.394	5.877	0.676	0.075	0.71485
4132.23	2.4200	6.351	5.873	0.671	0.070	0.71460
4166.67	2.4000	6.320	5.838	0.664	0.070	0.71320
4201.68	2.3800	6.286	5.807	0.657	0.069	0.71190
4237.29	2.3600	6.279	5.804	0.656	0.069	0.71180
4273.50	2.3400	6.247	5.790	0.651	0.066	0.71115

Table 22. Manganese.

PAGE 5

WN	WL	N	K	DN	DK	R
4310.35	2.3200	6.216	5.770	0.645	0.065	0.71030
4347.83	2.3000	6.194	5.752	0.641	0.064	0.70955
4385.96	2.2800	6.185	5.732	0.638	0.065	0.70875
4424.78	2.2600	6.152	5.742	0.636	0.060	0.70905
4464.29	2.2400	6.135	5.715	0.631	0.061	0.70795
4504.50	2.2200	6.101	5.707	0.626	0.058	0.70755
4545.45	2.2000	6.082	5.711	0.625	0.055	0.70765
4587.16	2.1800	6.041	5.698	0.619	0.052	0.70705
4629.63	2.1600	6.015	5.683	0.615	0.051	0.70640
4672.90	2.1400	5.992	5.680	0.612	0.048	0.70625
4716.98	2.1200	5.947	5.678	0.607	0.043	0.70610
4761.90	2.1000	5.909	5.659	0.601	0.041	0.70525
4807.69	2.0800	5.870	5.637	0.595	0.039	0.70430
4854.37	2.0600	5.845	5.626	0.591	0.037	0.70380
4901.96	2.0400	5.819	5.609	0.586	0.036	0.70305
4950.50	2.0200	5.800	5.593	0.583	0.036	0.70235
5000.00	2.0000	5.769	5.610	0.581	0.031	0.70305
5050.50	1.9800	5.721	5.622	0.577	0.024	0.70355
5102.04	1.9600	5.670	5.611	0.571	0.026	0.70310
5154.64	1.9400	5.610	5.594	0.564	0.030	0.70235
5208.33	1.9200	5.546	5.592	0.557	0.036	0.70230
5263.16	1.9000	5.494	5.568	0.550	0.039	0.70130
5319.15	1.8800	5.423	5.491	0.535	0.037	0.69785
5376.34	1.8600	5.431	5.467	0.533	0.034	0.69670
5434.78	1.8400	5.369	5.455	0.526	0.039	0.69625
5494.50	1.8200	5.338	5.412	0.519	0.037	0.69425
5555.56	1.8000	5.305	5.370	0.512	0.036	0.69230
5617.98	1.7800	5.281	5.359	0.509	0.037	0.69180
5681.82	1.7600	5.263	5.334	0.505	0.036	0.69060
5747.13	1.7400	5.215	5.325	0.499	0.040	0.69025
5813.95	1.7200	5.193	5.290	0.494	0.038	0.68855
5882.35	1.7000	5.149	5.280	0.489	0.042	0.68815
5952.38	1.6800	5.121	5.256	0.484	0.042	0.68700
6024.10	1.6600	5.088	5.233	0.479	0.042	0.68590
6097.56	1.6400	5.047	5.214	0.473	0.044	0.68500
6172.84	1.6200	5.012	5.206	0.469	0.046	0.68470
6250.00	1.6000	4.975	5.171	0.463	0.046	0.68300
6329.11	1.5800	4.934	5.155	0.458	0.048	0.68225
6410.26	1.5600	4.899	5.139	0.453	0.049	0.68155
6493.51	1.5400	4.851	5.112	0.446	0.051	0.68025
6578.95	1.5200	4.824	5.096	0.443	0.052	0.67950
6666.67	1.5000	4.780	5.080	0.437	0.054	0.67880
6756.76	1.4800	4.736	5.060	0.432	0.056	0.67790
6849.31	1.4600	4.700	5.037	0.427	0.056	0.67680
6944.44	1.4400	4.646	5.006	0.419	0.058	0.67535
7042.25	1.4200	4.611	4.993	0.415	0.059	0.67480
7142.86	1.4000	4.563	4.962	0.408	0.060	0.67325
7246.38	1.3800	4.537	4.941	0.404	0.060	0.67220
7352.94	1.3600	4.493	4.933	0.400	0.063	0.67200
7462.69	1.3400	4.436	4.911	0.393	0.065	0.67115

Table 22. Manganese.

PAGE 6

WN	WL	N	K	DN	DK	R
7575.76	1.3200	4.399	4.882	0.388	0.066	0.66965
7692.31	1.3000	4.350	4.867	0.382	0.068	0.66915
7812.50	1.2800	4.296	4.858	0.377	0.071	0.66905
7936.51	1.2600	4.243	4.826	0.370	0.072	0.66750
8064.52	1.2400	4.194	4.801	0.364	0.073	0.66640
8196.72	1.2200	4.140	4.773	0.357	0.075	0.66520
8333.33	1.2000	4.098	4.751	0.352	0.076	0.66425
8474.58	1.1800	4.032	4.741	0.346	0.080	0.66435
8620.69	1.1600	3.965	4.709	0.338	0.081	0.66305
8771.93	1.1400	3.908	4.673	0.331	0.082	0.66140
8928.57	1.1200	3.858	4.649	0.325	0.083	0.66050
9090.91	1.1000	3.793	4.624	0.318	0.085	0.65970
9259.26	1.0800	3.722	4.592	0.310	0.087	0.65860
9433.96	1.0600	3.657	4.550	0.302	0.088	0.65675
9615.38	1.0400	3.587	4.506	0.293	0.088	0.65475
9803.92	1.0200	3.521	4.457	0.285	0.088	0.65240
10000.00	1.0000	3.480	4.412	0.279	0.087	0.64975
10204.08	0.9800	3.409	4.382	0.272	0.089	0.64895
10416.67	0.9600	3.342	4.323	0.263	0.088	0.64580
10638.30	0.9400	3.287	4.265	0.255	0.086	0.64235
10869.56	0.9200	3.230	4.225	0.248	0.086	0.64040
11111.11	0.9000	3.177	4.161	0.241	0.084	0.63630
11363.64	0.8800	3.140	4.103	0.234	0.082	0.63220
11627.91	0.8600	3.103	4.066	0.230	0.081	0.62995
11904.76	0.8400	3.053	4.052	0.225	0.083	0.63010
12195.12	0.8200	2.985	4.011	0.218	0.093	0.62840
12500.00	0.8000	2.916	3.987	0.212	0.085	0.62845
12820.51	0.7800	2.835	3.932	0.204	0.085	0.62610
13157.89	0.7600	2.765	3.876	0.196	0.084	0.62315
13513.51	0.7400	2.702	3.819	0.189	0.083	0.61995
13888.89	0.7200	2.638	3.764	0.182	0.082	0.61695
14285.71	0.7000	2.575	3.710	0.175	0.081	0.61395
14705.88	0.6800	2.513	3.654	0.168	0.080	0.61075
15151.51	0.6600	2.450	3.606	0.162	0.079	0.60850
15625.00	0.6400	2.377	3.561	0.155	0.079	0.60725
16129.03	0.6200	2.298	3.501	0.148	0.078	0.60475
16666.67	0.6000	2.223	3.442	0.141	0.077	0.60210
17241.38	0.5800	2.138	3.380	0.133	0.077	0.60000
17857.14	0.5600	2.065	3.303	0.126	0.075	0.59525
18518.52	0.5400	1.988	3.239	0.119	0.073	0.59265
19230.77	0.5200	1.905	3.170	0.112	0.072	0.58995
20000.00	0.5000	1.816	3.093	0.104	0.070	0.58690
20833.33	0.4800	1.732	3.012	0.097	0.068	0.58320
21739.13	0.4600	1.639	2.926	0.089	0.066	0.57985
22727.27	0.4400	1.549	2.827	0.082	0.063	0.57460
23809.52	0.4200	1.460	2.724	0.074	0.060	0.56875
25000.00	0.4000	1.370	2.612	0.067	0.057	0.56170
26315.79	0.3800	1.287	2.484	0.060	0.053	0.55090
27777.78	0.3600	1.215	2.351	0.054	0.048	0.53660
29411.76	0.3400	1.148	2.219	0.048	0.044	0.52100

Table 22. Manganese.

PAGE 7

WN	WL	N	K	DN	DK	R
31250.00	0.3200	1.086	2.072	0.042	0.039	0.50010
33333.33	0.3000	1.048	1.921	0.038	0.034	0.47100
35714.29	0.2800	1.020	1.783	0.034	0.030	0.44090
38461.54	0.2600	1.001	1.652	0.031	0.027	0.40830
41666.67	0.2400	0.983	1.531	0.029	0.023	0.37630
45454.55	0.2200	0.957	1.421	0.026	0.021	0.34855



#### 4.19 Zinc (z).

The zinc sample was a 13 mm dia. x 1 cm long piece cut from a 99.999% pure zinc ingot. The sample was polished in a manner previously described for molybdenum in Section 4.16. The reflectance spectrum of the polished zinc sample was acquired throughout the 180-45,450  $\text{cm}^{-1}$  wave-number region.

We could find no previous work in the scientific literature on the optical properties of zinc other than that by Meier<sup>20</sup> which was referenced in the American Institute of Physics Handbook, second edition (1963). Therefore, we Kramers-Kronig analyzed the 180-45,450  $\text{cm}^{-1}$  reflectance spectrum and cutoff the values of  $n$  and  $k$  at 27,777  $\text{cm}^{-1}$  to eliminate, as much as possible, the effects of the absence of far ultraviolet reflectance spectrum of zinc. The values of  $n$  and  $k$  presented here are therefore tentative and subject to further examination. The values for  $n$  and  $k$  are greatly different from those determined by Meier in 1910. Meier has  $n$  varying from 0.72 at 0.3611  $\mu\text{m}$  to 2.618 at 0.668  $\mu\text{m}$ ; we have  $n$  varying from 8.9 to 12.9 in the same wavelength region. Similarly in the same wavelength region, Meier shows  $k$  changing from 2.61 to 5.083 and we have  $k$  changing from 6.0 to 2.1; the trends are opposites for  $k$ .

Until the above questions are resolved concerning the validity of these values of  $n$  and  $k$  for zinc, we recommend the CRDEC not distribute these data for zinc to the user community. The tentative results are presented in Figures 40 and 41 and in Table 23.

# ZINC

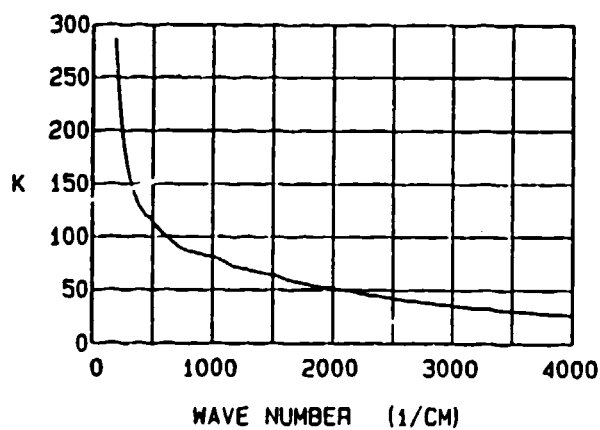
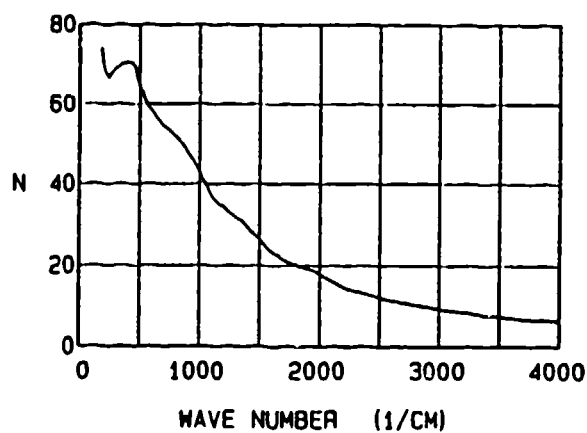
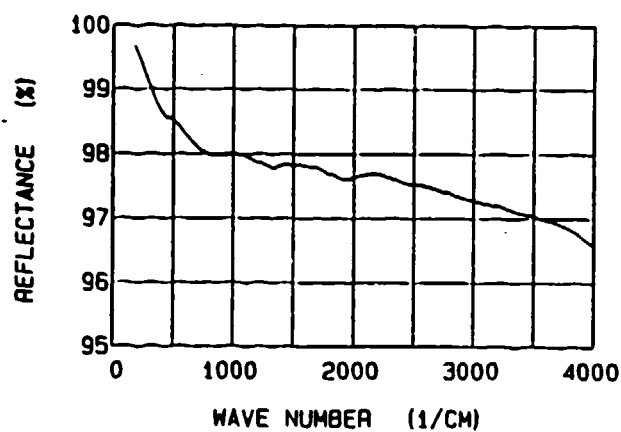


Figure 40. The infrared (180–4,000  $\text{cm}^{-1}$ ) reflectance and tentative values of refractive index  $N$  and extinction coefficient  $K$  spectra of zinc .

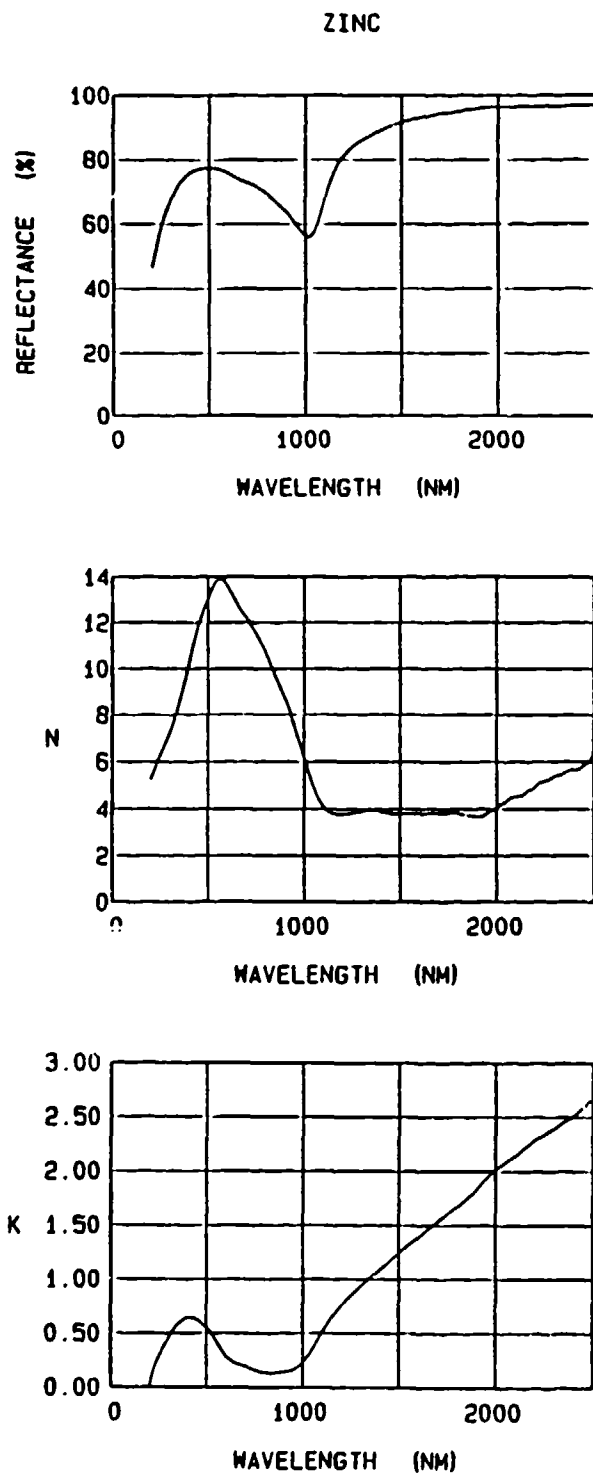


Figure 41. The uv-vis-nir (200-2,500 nm) reflectance and tentative values of refractive index  $N$  and extinction coefficient  $K$  spectra of zinc .

Table 23. Zinc (Tentative Values).

PAGE: 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	73.813	286.308	969.816	544.847	0.99665
220.00	45.4545	67.433	219.672	563.288	386.776	0.99494
260.00	38.4615	67.508	181.014	365.514	318.396	0.99284
300.00	33.3333	68.792	158.015	263.769	282.516	0.99084
340.00	29.4118	69.476	141.399	198.971	254.770	0.98894
380.00	26.3158	70.053	130.486	159.970	236.641	0.98739
420.00	23.8095	70.156	123.576	137.279	224.181	0.98629
460.00	21.7391	69.027	119.715	127.184	213.662	0.98574
500.00	20.0000	64.014	113.795	117.745	188.662	0.98519
540.00	18.5185	61.035	108.579	107.484	171.773	0.98449
580.00	17.2414	58.885	102.894	95.242	157.073	0.98349
620.00	16.1290	57.434	99.041	87.336	147.478	0.98274
660.00	15.1515	55.875	95.006	79.462	137.644	0.98189
700.00	14.2857	54.374	91.935	74.128	129.656	0.98124
740.00	13.5135	53.742	89.321	68.878	124.470	0.98054
780.00	12.8205	52.501	87.426	66.201	119.071	0.98014
820.00	12.1951	51.232	85.854	64.327	114.174	0.97984
860.00	11.6279	49.823	84.687	63.527	109.630	0.97970
900.00	11.1111	47.782	83.762	63.982	104.171	0.97979
940.00	10.6383	45.756	82.396	63.395	98.300	0.97974
980.00	10.2041	43.876	81.589	63.761	93.523	0.97989
1020.00	9.8039	41.320	80.128	63.384	86.744	0.98000
1060.00	9.4340	39.401	78.448	61.843	81.156	0.97989
1100.00	9.0909	37.075	76.542	60.202	74.735	0.97984
1140.00	8.7719	35.672	74.388	57.254	69.994	0.97939
1180.00	8.4746	34.663	72.269	54.116	66.141	0.97879
1220.00	8.1967	33.695	71.171	52.885	63.409	0.97864
1260.00	7.9365	32.638	69.591	50.867	60.146	0.97829
1300.00	7.6923	31.694	68.409	49.495	57.503	0.97809
1340.00	7.4627	31.211	67.433	48.152	55.856	0.97779
1380.00	7.2464	29.970	66.910	48.149	53.369	0.97809
1420.00	7.0423	28.488	65.919	47.479	50.154	0.97829
1460.00	6.8493	27.290	64.859	46.482	47.412	0.97834
1500.00	6.6667	26.292	63.629	45.075	44.923	0.97820
1540.00	6.4935	24.991	62.634	44.232	42.197	0.97840
1580.00	6.3291	23.878	61.254	42.663	39.564	0.97829
1620.00	6.1728	23.028	59.996	41.161	37.473	0.97809
1660.00	6.0241	22.399	58.979	39.933	35.906	0.97789
1700.00	5.8824	21.377	57.732	38.569	33.675	0.97784
1740.00	5.7471	20.769	56.505	37.059	32.093	0.97749
1780.00	5.6180	20.370	55.262	35.461	30.822	0.97694
1820.00	5.4945	19.833	54.558	34.709	29.699	0.97689
1860.00	5.3763	19.457	53.447	33.334	28.580	0.97639
1900.00	5.2632	19.153	52.638	32.362	27.741	0.97604
1940.00	5.1546	18.797	52.101	31.789	26.993	0.97595
1980.00	5.0505	18.191	51.668	31.457	25.997	0.97620
2020.00	4.9505	17.530	51.017	30.854	24.834	0.97635
2060.00	4.8544	16.819	50.436	30.360	23.666	0.97664
2100.00	4.7619	16.161	49.621	29.544	22.472	0.97670
2140.00	4.6729	15.488	48.904	28.861	21.332	0.97689

Table 23. Zinc (Tentative Values).

WN	WL	N	K	DN	DK	R
2180.00	4.5872	14.857	48.009	27.947	20.188	0.97690
2220.00	4.5043	14.292	47.102	27.009	19.142	0.97684
2260.00	4.4248	13.946	46.196	26.026	18.370	0.97649
2300.00	4.3478	13.635	45.405	25.184	17.700	0.97619
2340.00	4.2735	13.354	44.731	24.481	17.121	0.97595
2380.00	4.2017	13.008	43.986	23.725	16.454	0.97574
2420.00	4.1322	12.774	43.340	23.062	15.956	0.97545
2460.00	4.0650	12.480	42.726	22.457	15.416	0.97529
2500.00	4.0000	12.160	42.185	21.945	14.884	0.97525
2540.00	3.9370	11.777	41.558	21.359	14.267	0.97524
2580.00	3.8760	11.501	40.927	20.753	13.768	0.97504
2620.00	3.8168	11.221	40.288	20.149	13.271	0.97484
2660.00	3.7594	11.000	39.715	19.606	12.861	0.97460
2700.00	3.7037	10.746	39.111	19.048	12.417	0.97439
2740.00	3.6496	10.578	38.580	18.552	12.084	0.97409
2780.00	3.5971	10.328	38.085	18.113	11.691	0.97400
2820.00	3.5461	10.123	37.438	17.573	11.314	0.97369
2860.00	3.4965	9.956	37.009	17.145	11.014	0.97344
2900.00	3.4483	9.775	36.547	16.741	10.711	0.97324
2940.00	3.4014	9.616	36.060	16.315	10.423	0.97295
2980.00	3.3557	9.431	35.627	15.948	10.133	0.97280
3020.00	3.3113	9.224	35.147	15.546	9.815	0.97264
3060.00	3.2680	9.045	34.725	15.195	9.542	0.97249
3100.00	3.2258	8.913	34.293	14.833	9.308	0.97220
3140.00	3.1847	8.735	33.865	14.486	9.042	0.97204
3180.00	3.1447	8.559	33.480	14.178	8.793	0.97194
3220.00	3.1056	8.377	33.057	13.842	8.531	0.97180
3260.00	3.0675	8.199	32.624	13.501	8.275	0.97164
3300.00	3.0303	8.063	32.216	13.180	8.061	0.97139
3340.00	2.9940	7.924	31.804	12.859	7.847	0.97114
3380.00	2.9586	7.803	31.429	12.570	7.659	0.97089
3420.00	2.9240	7.662	31.076	12.304	7.464	0.97074
3460.00	2.8902	7.529	30.708	12.027	7.273	0.97054
3500.00	2.8571	7.397	30.342	11.756	7.086	0.97034
3540.00	2.8249	7.277	29.974	11.484	6.910	0.97009
3580.00	2.7933	7.163	29.619	11.224	6.743	0.96984
3620.00	2.7624	7.037	29.293	10.991	6.577	0.96969
3660.00	2.7322	6.911	28.943	10.742	6.407	0.96949
3700.00	2.7027	6.794	28.584	10.488	6.244	0.96924
3740.00	2.6738	6.702	28.229	10.239	6.101	0.96889
3780.00	2.6455	6.613	27.884	9.998	5.963	0.96854
3820.00	2.6178	6.554	27.553	9.769	5.850	0.96809
3860.00	2.5907	6.494	27.229	9.547	5.739	0.96764
3900.00	2.5641	6.474	26.922	9.335	5.658	0.96704
3940.00	2.5381	6.458	26.673	9.166	5.593	0.96654
3980.00	2.5126	6.477	26.476	9.031	5.562	0.96599
4032.26	2.4800	6.075	26.515	9.087	5.316	0.96794
4098.36	2.4400	5.826	25.784	8.614	5.009	0.96745
4166.67	2.4000	5.632	25.121	8.194	4.758	0.96684
4237.29	2.3600	5.598	24.711	7.934	4.656	0.96599

Table 23. Zinc (Tentative Values).

WN	WL	N	K	DN	DK	R
4310.34	2.3200	5.414	24.199	7.624	4.450	0.96566
4385.96	2.2800	5.313	23.788	7.377	4.313	0.96514
4464.29	2.2400	5.152	23.264	7.069	4.125	0.96464
4545.45	2.2000	4.977	22.876	6.848	3.958	0.96461
4629.63	2.1600	4.806	22.313	6.528	3.765	0.96406
4716.98	2.1200	4.549	21.713	6.199	3.527	0.96400
4807.69	2.0800	4.508	21.165	5.899	3.412	0.96254
4901.96	2.0400	4.281	20.700	5.655	3.223	0.96271
5000.00	2.0000	4.052	20.163	5.379	3.026	0.96272
5102.04	1.9600	3.853	19.480	5.035	2.827	0.96200
5208.33	1.9200	3.650	18.762	4.685	2.628	0.96118
5319.15	1.8800	3.698	17.946	4.302	2.528	0.95729
5434.78	1.8400	3.714	17.340	4.028	2.445	0.95427
5555.56	1.8000	3.818	16.712	3.754	2.391	0.94984
5681.32	1.7600	3.847	16.213	3.543	2.326	0.94660
5813.95	1.7200	3.833	15.633	3.306	2.232	0.94310
5952.38	1.6800	3.801	15.050	3.077	2.132	0.93945
6097.56	1.6400	3.814	14.498	2.867	2.051	0.93504
6250.00	1.6000	3.821	13.905	2.650	1.962	0.92987
6410.26	1.5600	3.805	13.337	2.451	1.870	0.92474
6578.95	1.5200	3.803	12.757	2.256	1.780	0.91864
6756.76	1.4800	3.789	12.112	2.049	1.677	0.91121
6944.44	1.4400	3.825	11.484	1.856	1.589	0.90200
7142.86	1.4000	3.886	10.865	1.673	1.505	0.89115
7352.94	1.3600	3.922	10.330	1.524	1.428	0.88091
7575.76	1.3200	3.920	9.720	1.362	1.330	0.86868
7812.50	1.2800	3.863	9.090	1.207	1.219	0.85549
8064.52	1.2400	3.801	8.361	1.038	1.093	0.83741
8333.33	1.2000	3.770	7.524	0.858	0.956	0.81110
8620.69	1.1600	3.768	6.582	0.670	0.809	0.77261
8928.57	1.1200	3.948	5.509	0.466	0.650	0.71358
9259.26	1.0800	4.315	4.337	0.237	0.484	0.63511
9615.38	1.0400	5.026	3.177	0.328	0.473	0.56885
10000.00	1.0000	6.031	2.260	0.462	0.433	0.55979
10416.67	0.9600	7.142	1.696	0.640	0.385	0.58897
10869.57	0.9200	8.215	1.421	0.846	0.365	0.62391
11363.64	0.8800	9.065	1.350	1.031	0.377	0.65019
11904.76	0.8400	9.874	1.271	1.226	0.382	0.67220
12500.00	0.8000	10.662	1.315	1.430	0.422	0.69200
13157.89	0.7600	11.362	1.538	1.623	0.521	0.70871
13888.89	0.7200	11.905	1.791	1.779	0.630	0.72099
14705.86	0.6800	12.369	2.039	1.917	0.741	0.73095
15625.00	0.6400	12.938	2.259	2.094	0.852	0.74185
16666.67	0.6000	13.580	2.849	2.292	1.118	0.75524
17857.14	0.5600	13.908	3.973	2.358	1.579	0.76760
19230.77	0.5200	13.496	5.090	2.149	1.944	0.77259
20833.33	0.4800	12.710	5.752	1.844	2.055	0.77130
22727.27	0.4400	11.678	6.325	1.485	2.056	0.76860
25000.00	0.4000	10.350	6.499	1.112	1.856	0.75934
27777.78	0.3600	8.992	6.001	0.841	1.490	0.73670

#### 4.20 Polydimethyl-Siloxane (SF-96).

Polydimethylsiloxane is an inert, tasteless, odorless, clear, oily fluid. Our sample of SF-96 was supplied by the Contracting Officer's Technical Representative (M. Milham).

The infrared reflectance of this liquid was measured in the 80-4,000  $\text{cm}^{-1}$  wave-number region by use of a procedure that has been transferred to CRDEC and is now commonly used. The reflectance spectrum was Kramers-Kronig analyzed to obtain spectral values of the complex refractive indices. The results are presented in Figure 42 and in pages 1-16 of Table 24.

In the near-infrared a thin wedge-shaped cell<sup>21</sup> was used to obtain four or more transmittance spectra of SF-96 from which the  $k$  spectrum could be determined. Kramers-Kronig analysis of the  $k$  spectrum then provided spectral values of  $n$ . The reflectance for 6.5 deg angle of incidence was then computed for s-polarization from the values of  $n$  and  $k$ . The  $k$ ,  $n$ , and reflectance spectra of SF-96 for the 801-2500 nm wavelength region are presented in Figure 42 and in pages 17-18 of Table 24.

The wedge-shaped cell and its use will be described in detail in the final technical report for CRDEC contract DAAA-15-85-K-0013.

POLYDIMETHYL-SILOXANE (SF96)

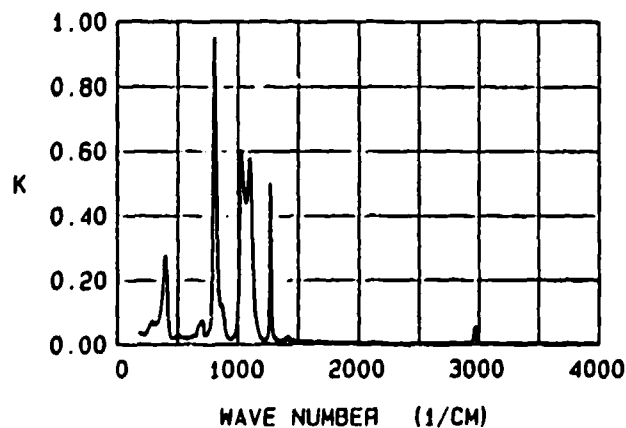
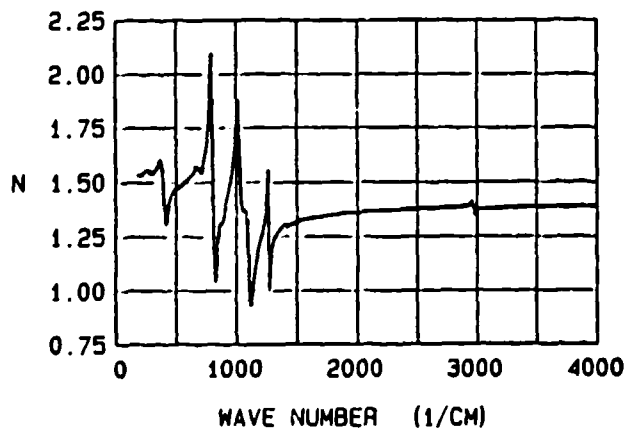
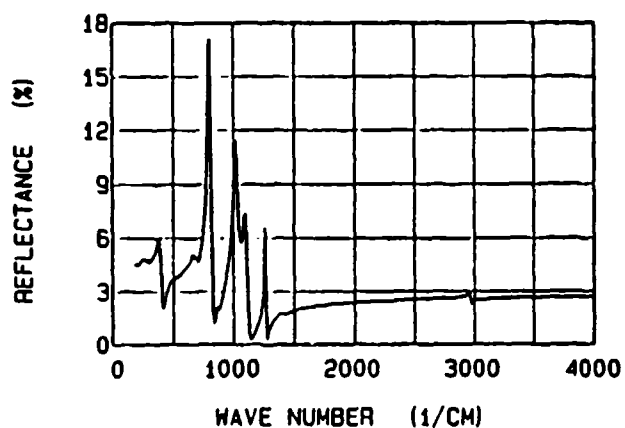


Figure 42. The infrared ( $180-4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of SF-96.  $N$  and  $K$  were determined by Kramers-Kronig analysis of the reflectance spectra .



# POLYDIMETHYL-SILOXANE (SF-96)

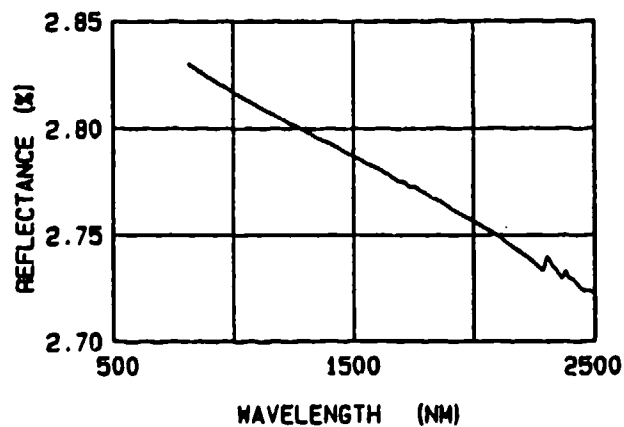
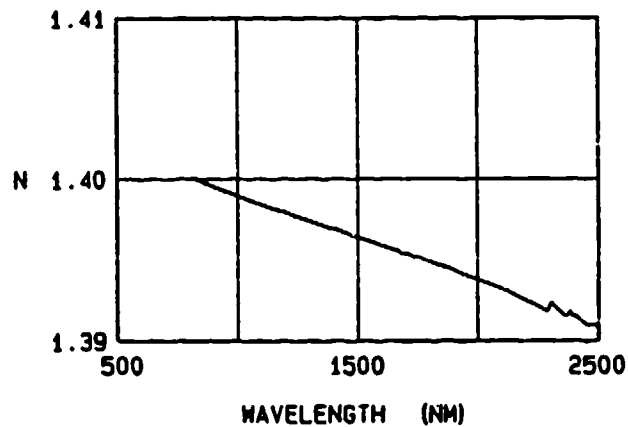
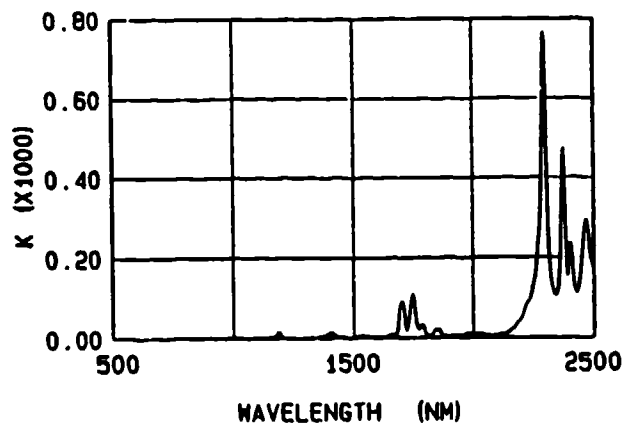


Figure 43. The extinction coefficient  $K$  and refractive index  $N$  spectra of SF-96 in the 800-2,500 nm region. The  $K$  spectrum was determined from transmittance measurements. The  $N$  spectrum was obtained from a Kramers-Kronig analysis of the  $K$  spectrum. Reflectance was computed from  $N$  and  $K$ .

Table 24. Polydimethylsiloxane (SF96).

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	1.533	0.034	0.014	0.015	0.04525
185.00	54.0541	1.531	0.036	0.009	0.015	0.04500
190.00	52.6316	1.530	0.035	0.009	0.015	0.04480
195.00	51.2821	1.530	0.034	0.009	0.015	0.04475
200.00	50.0000	1.529	0.033	0.009	0.015	0.04470
205.00	48.7805	1.531	0.031	0.009	0.015	0.04485
210.00	47.6190	1.532	0.032	0.009	0.015	0.04500
215.00	46.5116	1.532	0.030	0.009	0.015	0.04500
220.00	45.4545	1.535	0.028	0.009	0.015	0.04540
225.00	44.4444	1.539	0.029	0.009	0.015	0.04600
230.00	43.4783	1.542	0.030	0.009	0.015	0.04640
235.00	42.5532	1.546	0.031	0.009	0.015	0.04695
240.00	41.6667	1.551	0.035	0.009	0.016	0.04760
245.00	40.8163	1.553	0.040	0.009	0.016	0.04800
250.00	40.0000	1.555	0.046	0.009	0.016	0.04825
255.00	39.2157	1.555	0.051	0.009	0.016	0.04830
260.00	38.4615	1.554	0.056	0.009	0.016	0.04825
265.00	37.7358	1.550	0.060	0.009	0.016	0.04780
270.00	37.0370	1.551	0.063	0.009	0.016	0.04795
275.00	36.3636	1.549	0.067	0.010	0.016	0.04780
280.00	35.7143	1.544	0.071	0.010	0.016	0.04720
285.00	35.0877	1.539	0.070	0.010	0.016	0.04655
290.00	34.4828	1.536	0.069	0.010	0.016	0.04615
295.00	33.8983	1.536	0.067	0.010	0.016	0.04605
300.00	33.3333	1.536	0.066	0.010	0.016	0.04610
305.00	32.7869	1.537	0.065	0.010	0.016	0.04620
310.00	32.2581	1.540	0.063	0.010	0.016	0.04655
315.00	31.7460	1.543	0.064	0.010	0.016	0.04695
320.00	31.2500	1.546	0.065	0.010	0.016	0.04745
325.00	30.7692	1.550	0.067	0.010	0.016	0.04795
330.00	30.3030	1.555	0.069	0.010	0.016	0.04865
335.00	29.8507	1.560	0.073	0.010	0.016	0.04950
340.00	29.4118	1.563	0.082	0.010	0.017	0.05010
345.00	28.9855	1.566	0.084	0.010	0.017	0.05050
350.00	28.5714	1.576	0.091	0.010	0.017	0.05200
355.00	28.1690	1.582	0.101	0.011	0.017	0.05310
360.00	27.7778	1.590	0.116	0.011	0.018	0.05465
365.00	27.3973	1.596	0.136	0.012	0.018	0.05620
370.00	27.0270	1.597	0.164	0.012	0.019	0.05760
375.00	26.6667	1.589	0.198	0.013	0.019	0.05820
380.00	26.3158	1.567	0.231	0.014	0.013	0.05730
385.00	25.9740	1.530	0.258	0.014	0.017	0.05460
390.00	25.6410	1.485	0.273	0.014	0.016	0.05040
395.00	25.3165	1.433	0.275	0.014	0.015	0.04470
400.00	25.0000	1.379	0.257	0.013	0.014	0.03735
405.00	24.6914	1.336	0.219	0.013	0.013	0.02980
410.00	24.3902	1.311	0.169	0.012	0.012	0.02375
415.00	24.0964	1.307	0.116	0.012	0.011	0.02060
420.00	23.8095	1.323	0.073	0.011	0.010	0.02075
425.00	23.5294	1.348	0.048	0.010	0.010	0.02285

WN	WL	N	K	DN	DK	R
430.00	23.2558	1.370	0.034	0.010	0.010	0.02500
435.00	22.9885	1.387	0.027	0.010	0.011	0.02695
440.00	22.7273	1.400	0.024	0.009	0.011	0.02845
445.00	22.4719	1.411	0.020	0.009	0.011	0.02970
450.00	22.2222	1.423	0.019	0.009	0.011	0.03105
455.00	21.9780	1.431	0.019	0.009	0.012	0.03205
460.00	21.7391	1.437	0.019	0.009	0.012	0.03285
465.00	21.5054	1.444	0.019	0.009	0.012	0.03365
470.00	21.2766	1.450	0.020	0.009	0.012	0.03440
475.00	21.0526	1.455	0.021	0.009	0.012	0.03505
480.00	20.8333	1.460	0.023	0.009	0.013	0.03565
485.00	20.6186	1.462	0.025	0.009	0.013	0.03600
490.00	20.4082	1.464	0.028	0.009	0.013	0.03620
495.00	20.2020	1.464	0.028	0.009	0.013	0.03625
500.00	20.0000	1.465	0.028	0.009	0.013	0.03640
505.00	19.8020	1.466	0.028	0.009	0.013	0.03650
510.00	19.6078	1.468	0.026	0.009	0.013	0.03665
515.00	19.4175	1.470	0.026	0.009	0.013	0.03690
520.00	19.2308	1.471	0.025	0.009	0.013	0.03705
525.00	19.0476	1.473	0.024	0.009	0.013	0.03735
530.00	18.8679	1.476	0.023	0.009	0.013	0.03765
535.00	18.6916	1.478	0.022	0.009	0.013	0.03795
540.00	18.5185	1.480	0.022	0.009	0.013	0.03820
545.00	18.3486	1.482	0.021	0.009	0.013	0.03845
550.00	18.1818	1.485	0.021	0.009	0.013	0.03880
555.00	18.0180	1.486	0.020	0.009	0.013	0.03900
560.00	17.8571	1.489	0.019	0.008	0.013	0.03935
565.00	17.6991	1.492	0.019	0.008	0.013	0.03975
570.00	17.5439	1.495	0.019	0.008	0.013	0.04010
575.00	17.3913	1.498	0.018	0.008	0.014	0.04045
580.00	17.2414	1.501	0.018	0.008	0.014	0.04085
585.00	17.0940	1.504	0.018	0.008	0.014	0.04130
590.00	16.9492	1.508	0.019	0.008	0.014	0.04175
595.00	16.8067	1.510	0.019	0.008	0.014	0.04210
600.00	16.6667	1.514	0.020	0.008	0.014	0.04255
605.00	16.5289	1.517	0.021	0.008	0.014	0.04300
610.00	16.3934	1.520	0.022	0.008	0.014	0.04335
615.00	16.2602	1.523	0.022	0.008	0.014	0.04375
620.00	16.1290	1.527	0.023	0.008	0.015	0.04425
625.00	16.0000	1.530	0.024	0.008	0.015	0.04475
630.00	15.8730	1.535	0.026	0.008	0.015	0.04535
635.00	15.7480	1.535	0.028	0.009	0.015	0.04540
640.00	15.6250	1.538	0.025	0.008	0.015	0.04575
645.00	15.5039	1.545	0.025	0.008	0.015	0.04675
650.00	15.3846	1.554	0.025	0.008	0.015	0.04790
655.00	15.2672	1.562	0.032	0.008	0.016	0.04990
660.00	15.1515	1.572	0.050	0.009	0.016	0.05065
665.00	15.0376	1.562	0.059	0.009	0.016	0.04940
670.00	14.9254	1.558	0.057	0.009	0.016	0.04885
675.00	14.8148	1.562	0.057	0.009	0.016	0.04940

WN	WL	N	K	DN	DK	R
680.00	14.7059	1.565	0.063	0.009	0.016	0.04995
685.00	14.5985	1.562	0.070	0.010	0.016	0.04970
690.00	14.4928	1.558	0.072	0.010	0.016	0.04910
695.00	14.3885	1.556	0.071	0.010	0.016	0.04890
700.00	14.2857	1.553	0.073	0.010	0.016	0.04855
705.00	14.1844	1.546	0.071	0.010	0.016	0.04745
710.00	14.0845	1.540	0.058	0.009	0.016	0.04645
715.00	13.9860	1.549	0.040	0.009	0.016	0.04735
720.00	13.8889	1.564	0.032	0.008	0.016	0.04935
725.00	13.7931	1.579	0.028	0.008	0.016	0.05140
730.00	13.6986	1.596	0.027	0.008	0.017	0.05365
735.00	13.6054	1.612	0.028	0.008	0.017	0.05590
740.00	13.5135	1.629	0.030	0.008	0.018	0.05825
745.00	13.4228	1.646	0.033	0.008	0.019	0.06075
750.00	13.3333	1.666	0.038	0.008	0.019	0.06360
755.00	13.2450	1.685	0.043	0.009	0.020	0.06640
760.00	13.1579	1.710	0.044	0.009	0.021	0.07000
765.00	13.0719	1.748	0.048	0.009	0.022	0.07550
770.00	12.9870	1.799	0.060	0.009	0.024	0.08315
775.00	12.9032	1.866	0.088	0.010	0.027	0.09340
780.00	12.8205	1.951	0.146	0.013	0.031	0.10740
785.00	12.7389	2.043	0.264	0.018	0.035	0.12570
790.00	12.6582	2.095	0.475	0.027	0.037	0.14705
795.00	12.5786	2.005	0.745	0.036	0.031	0.16515
800.00	12.5000	1.744	0.930	0.036	0.017	0.17100
805.00	12.4224	1.442	0.923	0.029	0.007	0.15555
810.00	12.3457	1.241	0.790	0.021	0.005	0.12265
815.00	12.2699	1.143	0.650	0.016	0.005	0.08995
820.00	12.1951	1.078	0.532	0.013	0.006	0.06395
825.00	12.1212	1.041	0.391	0.009	0.006	0.03655
830.00	12.0482	1.075	0.258	0.007	0.009	0.01690
835.00	11.9760	1.142	0.186	0.010	0.012	0.01205
840.00	11.9048	1.196	0.156	0.012	0.011	0.01320
845.00	11.8343	1.230	0.139	0.012	0.011	0.01480
850.00	11.7647	1.258	0.123	0.012	0.011	0.01630
855.00	11.6959	1.287	0.116	0.012	0.011	0.01865
860.00	11.6279	1.305	0.121	0.012	0.011	0.02060
865.00	11.5607	1.309	0.124	0.012	0.011	0.02115
870.00	11.4943	1.307	0.118	0.012	0.011	0.02070
875.00	11.4286	1.307	0.106	0.012	0.011	0.02020
880.00	11.3636	1.309	0.089	0.012	0.010	0.01975
885.00	11.2994	1.318	0.069	0.011	0.010	0.02005
890.00	11.2360	1.333	0.053	0.011	0.010	0.02130
895.00	11.1732	1.350	0.043	0.010	0.010	0.02290
900.00	11.1111	1.366	0.034	0.010	0.010	0.02455
905.00	11.0497	1.381	0.029	0.010	0.010	0.02625
910.00	10.9890	1.396	0.025	0.009	0.011	0.02795
915.00	10.9290	1.410	0.022	0.009	0.011	0.02960
920.00	10.8696	1.425	0.020	0.009	0.011	0.03130
925.00	10.8108	1.439	0.019	0.009	0.012	0.03305

WN	WL	N	K	DN	DK	R
930.00	10.7527	1.452	0.017	0.009	0.012	0.03465
935.00	10.6952	1.466	0.017	0.009	0.013	0.03640
940.00	10.6383	1.481	0.017	0.008	0.013	0.03835
945.00	10.5820	1.497	0.017	0.008	0.014	0.04030
950.00	10.5263	1.512	0.019	0.008	0.014	0.04230
955.00	10.4712	1.529	0.020	0.008	0.015	0.04455
960.00	10.4167	1.546	0.024	0.008	0.015	0.04685
965.00	10.3627	1.565	0.026	0.008	0.016	0.04940
970.00	10.3093	1.587	0.030	0.008	0.017	0.05240
975.00	10.2564	1.612	0.037	0.009	0.018	0.05590
980.00	10.2041	1.639	0.045	0.009	0.019	0.05985
985.00	10.1523	1.672	0.058	0.009	0.020	0.06465
990.00	10.1010	1.710	0.077	0.010	0.021	0.07045
995.00	10.0503	1.756	0.106	0.011	0.023	0.07770
1000.00	10.0000	1.807	0.154	0.013	0.026	0.08660
1005.00	9.9502	1.860	0.236	0.016	0.028	0.09790
1010.00	9.9010	1.877	0.363	0.020	0.029	0.10855
1015.00	9.8522	1.822	0.499	0.024	0.026	0.11410
1020.00	9.8039	1.708	0.582	0.025	0.021	0.11105
1025.00	9.7561	1.592	0.600	0.023	0.017	0.10185
1030.00	9.7087	1.504	0.580	0.021	0.015	0.09080
1035.00	9.6618	1.445	0.547	0.019	0.013	0.08050
1040.00	9.6154	1.408	0.514	0.018	0.013	0.07215
1045.00	9.5694	1.385	0.486	0.017	0.012	0.06595
1050.00	9.5238	1.372	0.462	0.016	0.012	0.06130
1055.00	9.4787	1.367	0.446	0.016	0.012	0.05845
1060.00	9.4340	1.366	0.438	0.016	0.012	0.05725
1065.00	9.3897	1.367	0.438	0.016	0.013	0.05735
1070.00	9.3458	1.366	0.448	0.016	0.012	0.05880
1075.00	9.3023	1.361	0.467	0.016	0.012	0.06125
1080.00	9.2593	1.346	0.496	0.016	0.011	0.06475
1085.00	9.2166	1.315	0.531	0.017	0.010	0.06870
1090.00	9.1743	1.261	0.564	0.016	0.008	0.07230
1095.00	9.1324	1.182	0.578	0.015	0.005	0.07345
1100.00	9.0909	1.092	0.561	0.013	0.006	0.07010
1105.00	9.0498	1.011	0.507	0.012	0.007	0.06105
1110.00	9.0090	0.956	0.428	0.010	0.007	0.04735
1115.00	8.9686	0.932	0.341	0.009	0.008	0.03225
1120.00	8.9286	0.938	0.262	0.008	0.008	0.01940
1125.00	8.8889	0.961	0.199	0.007	0.010	0.01090
1130.00	8.8496	0.991	0.154	0.005	0.013	0.00610
1135.00	8.8106	1.021	0.121	0.004	0.017	0.00380
1140.00	8.7719	1.048	0.098	0.010	0.019	0.00290
1145.00	8.7336	1.072	0.081	0.015	0.017	0.00280
1150.00	8.6957	1.095	0.067	0.017	0.014	0.00315
1155.00	8.6580	1.115	0.057	0.018	0.011	0.00375
1160.00	8.6207	1.133	0.048	0.017	0.009	0.00450
1165.00	8.5837	1.150	0.042	0.016	0.008	0.00535
1170.00	8.5470	1.163	0.037	0.016	0.007	0.00610
1175.00	8.5106	1.176	0.030	0.015	0.007	0.00690

Table 24. Polydimethylsiloxane (SF96).

PAGE 5

WN	WL	N	K	DN	DK	R
1180.00	8.4746	1.191	0.026	0.014	0.006	0.00790
1185.00	8.4388	1.203	0.022	0.013	0.006	0.00880
1190.00	8.4034	1.217	0.019	0.013	0.006	0.00990
1195.00	8.3682	1.228	0.018	0.012	0.006	0.01080
1200.00	8.3333	1.239	0.016	0.012	0.007	0.01170
1205.00	8.2988	1.251	0.014	0.012	0.007	0.01275
1210.00	8.2645	1.263	0.013	0.011	0.007	0.01385
1215.00	8.2305	1.276	0.012	0.011	0.007	0.01500
1220.00	8.1967	1.289	0.013	0.011	0.008	0.01625
1225.00	8.1633	1.303	0.013	0.010	0.008	0.01770
1230.00	8.1301	1.319	0.014	0.010	0.008	0.01930
1235.00	8.0972	1.339	0.016	0.010	0.009	0.02150
1240.00	8.0645	1.367	0.020	0.010	0.010	0.02460
1245.00	8.0321	1.409	0.032	0.009	0.011	0.02950
1250.00	8.0000	1.474	0.070	0.010	0.014	0.03810
1255.00	7.9681	1.551	0.201	0.013	0.018	0.05345
1260.00	7.9365	1.443	0.450	0.017	0.014	0.06570
1265.00	7.9051	1.127	0.448	0.011	0.006	0.04680
1270.00	7.8740	1.009	0.232	0.006	0.009	0.01350
1275.00	7.8431	1.063	0.092	0.012	0.018	0.00300
1280.00	7.8125	1.125	0.051	0.017	0.010	0.00415
1285.00	7.7821	1.161	0.037	0.016	0.007	0.00595
1290.00	7.7519	1.183	0.030	0.014	0.007	0.00740
1295.00	7.7220	1.200	0.025	0.014	0.006	0.00855
1300.00	7.6923	1.212	0.020	0.013	0.006	0.00950
1305.00	7.6628	1.223	0.018	0.013	0.006	0.01035
1310.00	7.6336	1.232	0.016	0.012	0.006	0.01110
1315.00	7.6046	1.240	0.015	0.012	0.007	0.01180
1320.00	7.5758	1.247	0.015	0.012	0.007	0.01235
1325.00	7.5472	1.252	0.014	0.012	0.007	0.01285
1330.00	7.5188	1.258	0.013	0.011	0.007	0.01335
1335.00	7.4906	1.262	0.012	0.011	0.007	0.01375
1340.00	7.4627	1.267	0.012	0.011	0.007	0.01415
1345.00	7.4349	1.271	0.012	0.011	0.007	0.01455
1350.00	7.4074	1.275	0.012	0.011	0.007	0.01490
1355.00	7.3801	1.278	0.012	0.011	0.007	0.01520
1360.00	7.3529	1.281	0.012	0.011	0.007	0.01555
1365.00	7.3260	1.284	0.012	0.011	0.007	0.01585
1370.00	7.2993	1.287	0.012	0.011	0.007	0.01610
1375.00	7.2727	1.290	0.012	0.011	0.008	0.01640
1380.00	7.2464	1.293	0.012	0.011	0.008	0.01670
1385.00	7.2202	1.297	0.012	0.010	0.008	0.01710
1390.00	7.1942	1.302	0.015	0.010	0.008	0.01755
1395.00	7.1685	1.304	0.020	0.011	0.008	0.01780
1400.00	7.1429	1.302	0.023	0.011	0.008	0.01770
1405.00	7.1174	1.300	0.025	0.011	0.008	0.01750
1410.00	7.0922	1.299	0.026	0.011	0.008	0.01735
1415.00	7.0671	1.295	0.026	0.011	0.008	0.01700
1420.00	7.0423	1.292	0.022	0.011	0.008	0.01665
1425.00	7.0175	1.293	0.016	0.011	0.008	0.01675

Table 24. Polydimethylsiloxane (SF96).

PAGE 6

WN	WL	N	K	DN	DK	R
1430.00	6.9930	1.297	0.014	0.011	0.008	0.01710
1435.00	6.9686	1.300	0.013	0.010	0.008	0.01740
1440.00	6.9444	1.302	0.014	0.010	0.008	0.01760
1445.00	6.9204	1.303	0.014	0.010	0.008	0.01765
1450.00	6.8966	1.303	0.014	0.010	0.008	0.01770
1455.00	6.8729	1.303	0.012	0.010	0.008	0.01770
1460.00	6.8493	1.304	0.011	0.010	0.008	0.01775
1465.00	6.8259	1.306	0.008	0.010	0.008	0.01795
1470.00	6.8027	1.309	0.008	0.010	0.008	0.01830
1475.00	6.7797	1.310	0.009	0.010	0.008	0.01835
1480.00	6.7568	1.311	0.008	0.010	0.008	0.01845
1485.00	6.7340	1.313	0.007	0.010	0.007	0.01870
1490.00	6.7114	1.315	0.008	0.010	0.008	0.01885
1495.00	6.6890	1.315	0.008	0.010	0.008	0.01890
1500.00	6.6667	1.316	0.007	0.010	0.007	0.01900
1505.00	6.6445	1.318	0.007	0.010	0.007	0.01920
1510.00	6.6225	1.318	0.007	0.010	0.007	0.01920
1515.00	6.6007	1.320	0.006	0.010	0.006	0.01945
1520.00	6.5789	1.322	0.008	0.010	0.008	0.01960
1525.00	6.5574	1.322	0.009	0.010	0.008	0.01960
1530.00	6.5359	1.322	0.008	0.010	0.008	0.01960
1535.00	6.5147	1.324	0.007	0.010	0.007	0.01980
1540.00	6.4935	1.324	0.008	0.010	0.008	0.01985
1545.00	6.4725	1.324	0.007	0.010	0.007	0.01985
1550.00	6.4516	1.326	0.006	0.010	0.006	0.02000
1555.00	6.4309	1.328	0.007	0.010	0.007	0.02020
1560.00	6.4103	1.328	0.008	0.010	0.008	0.02020
1565.00	6.3898	1.328	0.008	0.010	0.008	0.02020
1570.00	6.3694	1.328	0.007	0.010	0.007	0.02030
1575.00	6.3492	1.329	0.008	0.010	0.008	0.02040
1580.00	6.3291	1.329	0.008	0.010	0.008	0.02040
1585.00	6.3091	1.330	0.007	0.010	0.007	0.02050
1590.00	6.2893	1.331	0.007	0.010	0.007	0.02060
1595.00	6.2696	1.331	0.007	0.010	0.007	0.02060
1600.00	6.2500	1.332	0.007	0.010	0.007	0.02065
1605.00	6.2305	1.332	0.007	0.010	0.007	0.02070
1610.00	6.2112	1.333	0.007	0.010	0.007	0.02075
1615.00	6.1920	1.333	0.007	0.010	0.007	0.02080
1620.00	6.1728	1.334	0.007	0.010	0.007	0.02085
1625.00	6.1538	1.334	0.006	0.010	0.006	0.02090
1630.00	6.1350	1.335	0.006	0.010	0.006	0.02095
1635.00	6.1162	1.336	0.006	0.010	0.006	0.02105
1640.00	6.0976	1.336	0.006	0.010	0.006	0.02110
1645.00	6.0790	1.336	0.006	0.010	0.006	0.02115
1650.00	6.0606	1.337	0.006	0.010	0.006	0.02120
1655.00	6.0423	1.337	0.006	0.010	0.006	0.02125
1660.00	6.0241	1.338	0.006	0.010	0.006	0.02130
1665.00	6.0060	1.338	0.006	0.010	0.006	0.02135
1670.00	5.9880	1.339	0.006	0.010	0.006	0.02140
1675.00	5.9701	1.339	0.005	0.010	0.005	0.02145

Table 24. Polydimethylsiloxane (SF96).

PAGE 7

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.340	0.005	0.010	0.005	0.02155
1685.00	5.9347	1.340	0.005	0.010	0.005	0.02155
1690.00	5.9172	1.341	0.006	0.010	0.006	0.02160
1695.00	5.8997	1.341	0.005	0.010	0.005	0.02165
1700.00	5.8824	1.342	0.005	0.010	0.005	0.02170
1705.00	5.8651	1.342	0.005	0.010	0.005	0.02170
1710.00	5.8480	1.342	0.005	0.009	0.005	0.02175
1715.00	5.8309	1.343	0.005	0.009	0.005	0.02180
1720.00	5.8140	1.343	0.005	0.009	0.005	0.02185
1725.00	5.7971	1.343	0.005	0.009	0.005	0.02190
1730.00	5.7803	1.344	0.005	0.009	0.005	0.02195
1735.00	5.7637	1.344	0.005	0.009	0.005	0.02195
1740.00	5.7471	1.344	0.005	0.009	0.005	0.02200
1745.00	5.7307	1.345	0.004	0.009	0.004	0.02205
1750.00	5.7143	1.345	0.004	0.009	0.004	0.02205
1755.00	5.6980	1.346	0.004	0.009	0.004	0.02215
1760.00	5.6818	1.346	0.004	0.009	0.004	0.02220
1765.00	5.6657	1.347	0.004	0.009	0.004	0.02225
1770.00	5.6497	1.347	0.004	0.009	0.004	0.02225
1775.00	5.6338	1.347	0.004	0.009	0.004	0.02230
1780.00	5.6180	1.348	0.004	0.009	0.004	0.02235
1785.00	5.6022	1.348	0.004	0.009	0.004	0.02235
1790.00	5.5866	1.348	0.004	0.009	0.004	0.02240
1795.00	5.5710	1.348	0.004	0.009	0.004	0.02240
1800.00	5.5556	1.349	0.004	0.009	0.004	0.02245
1805.00	5.5402	1.349	0.003	0.009	0.003	0.02245
1810.00	5.5249	1.349	0.004	0.009	0.004	0.02250
1815.00	5.5096	1.349	0.003	0.009	0.003	0.02255
1820.00	5.4945	1.349	0.003	0.009	0.003	0.02255
1825.00	5.4795	1.350	0.003	0.009	0.003	0.02260
1830.00	5.4645	1.350	0.003	0.009	0.003	0.02265
1835.00	5.4496	1.351	0.003	0.009	0.003	0.02270
1840.00	5.4348	1.351	0.002	0.009	0.002	0.02275
1845.00	5.4201	1.352	0.002	0.009	0.002	0.02280
1850.00	5.4054	1.352	0.002	0.009	0.002	0.02285
1855.00	5.3908	1.353	0.002	0.009	0.002	0.02295
1860.00	5.3763	1.354	0.002	0.009	0.002	0.02300
1865.00	5.3619	1.354	0.003	0.009	0.003	0.02300
1870.00	5.3476	1.354	0.003	0.009	0.003	0.02305
1875.00	5.3333	1.354	0.003	0.009	0.003	0.02305
1880.00	5.3191	1.354	0.003	0.009	0.003	0.02305
1885.00	5.3050	1.354	0.003	0.009	0.003	0.02310
1890.00	5.2910	1.354	0.003	0.009	0.003	0.02310
1895.00	5.2770	1.355	0.003	0.009	0.003	0.02315
1900.00	5.2632	1.355	0.003	0.009	0.003	0.02320
1905.00	5.2493	1.356	0.003	0.009	0.003	0.02325
1910.00	5.2356	1.356	0.003	0.009	0.003	0.02330
1915.00	5.2219	1.356	0.003	0.009	0.003	0.02330
1920.00	5.2083	1.357	0.003	0.009	0.003	0.02335
1925.00	5.1948	1.357	0.003	0.009	0.003	0.02335



Table 24. Polydimethylsiloxane (SF96).

PAGE 8

WN	WL	N	K	DN	DK	R
1930.00	5.1813	1.357	0.004	0.009	0.004	0.02340
1935.00	5.1680	1.357	0.004	0.009	0.004	0.02340
1940.00	5.1546	1.358	0.004	0.009	0.004	0.02345
1945.00	5.1414	1.357	0.004	0.009	0.004	0.02340
1950.00	5.1282	1.357	0.004	0.009	0.004	0.02340
1955.00	5.1151	1.357	0.004	0.009	0.004	0.02340
1960.00	5.1020	1.357	0.004	0.009	0.004	0.02340
1965.00	5.0891	1.357	0.004	0.009	0.004	0.02340
1970.00	5.0761	1.358	0.004	0.009	0.004	0.02345
1975.00	5.0633	1.358	0.004	0.009	0.004	0.02350
1980.00	5.0505	1.358	0.004	0.009	0.004	0.02350
1985.00	5.0378	1.358	0.004	0.009	0.004	0.02355
1990.00	5.0251	1.358	0.004	0.009	0.004	0.02350
1995.00	5.0125	1.358	0.004	0.009	0.004	0.02350
2000.00	5.0000	1.358	0.004	0.009	0.004	0.02345
2005.00	4.9875	1.358	0.004	0.009	0.004	0.02345
2010.00	4.9751	1.358	0.003	0.009	0.003	0.02345
2015.00	4.9628	1.358	0.003	0.009	0.003	0.02345
2020.00	4.9505	1.358	0.002	0.009	0.002	0.02350
2025.00	4.9383	1.359	0.002	0.009	0.002	0.02355
2030.00	4.9261	1.359	0.002	0.009	0.002	0.02360
2035.00	4.9140	1.359	0.002	0.009	0.002	0.02365
2040.00	4.9020	1.360	0.002	0.009	0.002	0.02370
2045.00	4.8900	1.360	0.002	0.009	0.002	0.02370
2050.00	4.8780	1.360	0.002	0.009	0.002	0.02375
2055.00	4.8662	1.360	0.002	0.009	0.002	0.02375
2060.00	4.8544	1.360	0.002	0.009	0.002	0.02375
2065.00	4.8426	1.360	0.002	0.009	0.002	0.02375
2070.00	4.8309	1.360	0.002	0.009	0.002	0.02375
2075.00	4.8193	1.360	0.002	0.009	0.002	0.02375
2080.00	4.8077	1.361	0.002	0.009	0.002	0.02380
2085.00	4.7962	1.361	0.002	0.009	0.002	0.02380
2090.00	4.7847	1.361	0.002	0.009	0.002	0.02385
2095.00	4.7733	1.362	0.001	0.009	0.001	0.02390
2100.00	4.7619	1.362	0.001	0.009	0.001	0.02390
2105.00	4.7506	1.362	0.002	0.009	0.002	0.02395
2110.00	4.7393	1.362	0.002	0.009	0.002	0.02395
2115.00	4.7281	1.362	0.002	0.009	0.002	0.02395
2120.00	4.7170	1.363	0.001	0.009	0.001	0.02400
2125.00	4.7059	1.363	0.001	0.009	0.001	0.02400
2130.00	4.6948	1.363	0.001	0.009	0.001	0.02400
2135.00	4.6838	1.363	0.001	0.009	0.001	0.02405
2140.00	4.6729	1.363	0.001	0.009	0.001	0.02405
2145.00	4.6620	1.363	0.001	0.009	0.001	0.02410
2150.00	4.6512	1.364	0.001	0.009	0.001	0.02415
2155.00	4.6404	1.364	0.001	0.009	0.001	0.02415
2160.00	4.6296	1.364	0.001	0.009	0.001	0.02415
2165.00	4.6189	1.364	0.001	0.009	0.001	0.02415
2170.00	4.6083	1.364	0.001	0.009	0.001	0.02415
2175.00	4.5977	1.364	0.001	0.009	0.001	0.02415

Table 24. Polydimethylsiloxane (SF96).

PAGE 9

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.364	0.001	0.009	0.001	0.02420
2185.00	4.5767	1.364	0.001	0.009	0.001	0.02420
2190.00	4.5662	1.365	0.001	0.009	0.001	0.02425
2195.00	4.5558	1.365	0.001	0.009	0.001	0.02425
2200.00	4.5455	1.365	0.001	0.009	0.001	0.02425
2205.00	4.5351	1.365	0.001	0.009	0.001	0.02430
2210.00	4.5249	1.365	0.001	0.009	0.001	0.02430
2215.00	4.5147	1.365	0.001	0.009	0.001	0.02430
2220.00	4.5045	1.365	0.001	0.009	0.001	0.02430
2225.00	4.4944	1.366	0.001	0.009	0.001	0.02435
2230.00	4.4843	1.366	0.001	0.009	0.001	0.02435
2235.00	4.4743	1.366	0.001	0.009	0.001	0.02440
2240.00	4.4643	1.366	0.001	0.009	0.001	0.02440
2245.00	4.4543	1.366	0.001	0.009	0.001	0.02440
2250.00	4.4444	1.367	0.000	0.009	0.000	0.02445
2255.00	4.4346	1.366	0.001	0.009	0.001	0.02440
2260.00	4.4248	1.366	0.000	0.009	0.000	0.02440
2265.00	4.4150	1.367	0.000	0.009	0.000	0.02445
2270.00	4.4053	1.367	0.000	0.009	0.000	0.02445
2275.00	4.3956	1.367	0.000	0.009	0.000	0.02445
2280.00	4.3850	1.367	0.000	0.009	0.000	0.02450
2285.00	4.3754	1.367	0.000	0.009	0.000	0.02450
2290.00	4.3668	1.367	0.000	0.009	0.000	0.02455
2295.00	4.3573	1.367	0.000	0.009	0.000	0.02455
2300.00	4.3478	1.367	0.000	0.009	0.000	0.02455
2305.00	4.3384	1.368	0.000	0.009	0.000	0.02460
2310.00	4.3290	1.368	0.000	0.009	0.000	0.02460
2315.00	4.3197	1.368	0.000	0.009	0.000	0.02460
2320.00	4.3103	1.368	0.000	0.009	0.000	0.02460
2325.00	4.3011	1.368	0.000	0.009	0.000	0.02465
2330.00	4.2918	1.368	0.000	0.009	0.000	0.02465
2335.00	4.2827	1.368	0.000	0.009	0.000	0.02465
2340.00	4.2735	1.368	0.000	0.009	0.001	0.02465
2345.00	4.2644	1.369	0.000	0.009	0.001	0.02470
2350.00	4.2553	1.369	0.000	0.009	0.001	0.02475
2355.00	4.2463	1.369	0.000	0.009	0.001	0.02475
2360.00	4.2373	1.370	0.000	0.009	0.001	0.02480
2365.00	4.2283	1.370	0.000	0.009	0.001	0.02480
2370.00	4.2194	1.370	0.000	0.009	0.001	0.02485
2375.00	4.2105	1.370	0.000	0.009	0.001	0.02485
2380.00	4.2017	1.370	0.000	0.009	0.000	0.02480
2385.00	4.1929	1.370	0.000	0.009	0.001	0.02480
2390.00	4.1841	1.370	0.000	0.009	0.001	0.02485
2395.00	4.1754	1.371	0.000	0.009	0.001	0.02490
2400.00	4.1667	1.371	0.000	0.009	0.002	0.02495
2405.00	4.1580	1.371	0.000	0.009	0.001	0.02500
2410.00	4.1494	1.372	0.000	0.009	0.001	0.02505
2415.00	4.1408	1.372	0.000	0.009	0.001	0.02505
2420.00	4.1322	1.372	0.000	0.009	0.001	0.02505
2425.00	4.1237	1.372	0.000	0.009	0.001	0.02505

Table 24. Polydimethylsiloxane (SF96).

PAGE 10

WN	WL	N	K	DN	DK	R
2430.00	4.1152	1.372	0.000	0.009	0.001	0.02505
2435.00	4.1068	1.372	0.000	0.009	0.001	0.02505
2440.00	4.0984	1.372	0.000	0.009	0.001	0.02505
2445.00	4.0900	1.372	0.000	0.009	0.001	0.02510
2450.00	4.0816	1.372	0.000	0.009	0.001	0.02510
2455.00	4.0733	1.373	0.000	0.009	0.001	0.02515
2460.00	4.0650	1.373	0.000	0.009	0.001	0.02515
2465.00	4.0568	1.373	0.000	0.009	0.001	0.02515
2470.00	4.0486	1.373	0.000	0.009	0.001	0.02520
2475.00	4.0404	1.373	0.000	0.009	0.001	0.02520
2480.00	4.0323	1.373	0.000	0.009	0.001	0.02520
2485.00	4.0241	1.374	0.000	0.009	0.001	0.02525
2490.00	4.0161	1.374	0.000	0.009	0.001	0.02525
2495.00	4.0080	1.374	0.000	0.009	0.001	0.02525
2500.00	4.0000	1.374	0.000	0.009	0.001	0.02525
2505.00	3.9920	1.374	0.000	0.009	0.001	0.02525
2510.00	3.9841	1.374	0.000	0.009	0.001	0.02530
2515.00	3.9761	1.374	0.000	0.009	0.001	0.02530
2520.00	3.9683	1.374	0.000	0.009	0.001	0.02530
2525.00	3.9604	1.375	0.000	0.009	0.001	0.02535
2530.00	3.9526	1.375	0.000	0.009	0.000	0.02535
2535.00	3.9448	1.375	0.000	0.009	0.000	0.02535
2540.00	3.9370	1.375	0.000	0.009	0.000	0.02535
2545.00	3.9293	1.375	0.000	0.009	0.000	0.02535
2550.00	3.9216	1.375	0.000	0.009	0.001	0.02535
2555.00	3.9139	1.375	0.000	0.009	0.001	0.02540
2560.00	3.9063	1.375	0.000	0.009	0.001	0.02540
2565.00	3.8986	1.375	0.000	0.009	0.001	0.02540
2570.00	3.8911	1.375	0.000	0.009	0.001	0.02545
2575.00	3.8835	1.375	0.000	0.009	0.000	0.02545
2580.00	3.8760	1.375	0.000	0.009	0.000	0.02545
2585.00	3.8685	1.375	0.000	0.009	0.001	0.02545
2590.00	3.8610	1.375	0.000	0.009	0.001	0.02545
2595.00	3.8536	1.376	0.000	0.009	0.001	0.02550
2600.00	3.8462	1.376	0.000	0.009	0.001	0.02550
2605.00	3.8388	1.376	0.000	0.009	0.001	0.02555
2610.00	3.8314	1.376	0.000	0.009	0.000	0.02555
2615.00	3.8241	1.376	0.000	0.009	0.001	0.02555
2620.00	3.8168	1.376	0.000	0.009	0.000	0.02555
2625.00	3.8095	1.376	0.000	0.009	0.000	0.02555
2630.00	3.8023	1.376	0.000	0.009	0.001	0.02555
2635.00	3.7951	1.377	0.000	0.009	0.001	0.02560
2640.00	3.7879	1.377	0.000	0.009	0.001	0.02560
2645.00	3.7807	1.377	0.000	0.009	0.001	0.02565
2650.00	3.7736	1.377	0.000	0.009	0.000	0.02565
2655.00	3.7665	1.377	0.000	0.009	0.001	0.02565
2660.00	3.7594	1.378	0.000	0.009	0.000	0.02570
2665.00	3.7523	1.378	0.000	0.009	0.000	0.02570
2670.00	3.7453	1.378	0.000	0.009	0.000	0.02570
2675.00	3.7383	1.378	0.000	0.009	0.000	0.02570

Table 24. Polydimethylsiloxane (SF96).

PAGE 11

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.378	0.000	0.009	0.000	0.02570
2685.00	3.7244	1.378	0.000	0.009	0.000	0.02570
2690.00	3.7175	1.378	0.000	0.009	0.000	0.02570
2695.00	3.7106	1.378	0.000	0.009	0.001	0.02570
2700.00	3.7037	1.378	0.000	0.009	0.001	0.02570
2705.00	3.6969	1.378	0.000	0.009	0.001	0.02580
2710.00	3.6900	1.379	0.000	0.009	0.001	0.02585
2715.00	3.6832	1.379	0.000	0.009	0.000	0.02585
2720.00	3.6765	1.379	0.000	0.009	0.001	0.02585
2725.00	3.6697	1.379	0.000	0.009	0.000	0.02585
2730.00	3.6630	1.379	0.000	0.009	0.001	0.02585
2735.00	3.6563	1.379	0.000	0.009	0.000	0.02590
2740.00	3.6496	1.379	0.000	0.009	0.001	0.02590
2745.00	3.6430	1.380	0.000	0.009	0.000	0.02595
2750.00	3.6364	1.380	0.000	0.009	0.001	0.02600
2755.00	3.6298	1.380	0.000	0.009	0.000	0.02600
2760.00	3.6232	1.380	0.000	0.009	0.000	0.02600
2765.00	3.6166	1.380	0.000	0.009	0.000	0.02600
2770.00	3.6101	1.381	0.000	0.009	0.000	0.02605
2775.00	3.6036	1.381	0.000	0.009	0.000	0.02605
2780.00	3.5971	1.381	0.000	0.009	0.000	0.02605
2785.00	3.5907	1.382	0.000	0.009	0.000	0.02615
2790.00	3.5842	1.382	0.001	0.009	0.001	0.02615
2795.00	3.5778	1.382	0.001	0.009	0.001	0.02615
2800.00	3.5714	1.381	0.001	0.009	0.001	0.02610
2805.00	3.5651	1.382	0.000	0.009	0.000	0.02615
2810.00	3.5587	1.382	0.001	0.009	0.001	0.02620
2815.00	3.5524	1.381	0.001	0.009	0.001	0.02610
2820.00	3.5461	1.382	0.001	0.009	0.001	0.02620
2825.00	3.5398	1.382	0.000	0.009	0.000	0.02620
2830.00	3.5336	1.383	0.001	0.009	0.001	0.02630
2835.00	3.5273	1.383	0.001	0.009	0.001	0.02630
2840.00	3.5211	1.383	0.001	0.009	0.001	0.02630
2845.00	3.5149	1.383	0.001	0.009	0.001	0.02630
2850.00	3.5088	1.383	0.001	0.009	0.001	0.02635
2855.00	3.5026	1.384	0.001	0.009	0.001	0.02640
2860.00	3.4965	1.384	0.000	0.009	0.000	0.02640
2865.00	3.4904	1.385	0.000	0.009	0.000	0.02655
2870.00	3.4843	1.385	0.001	0.009	0.001	0.02660
2875.00	3.4783	1.386	0.002	0.009	0.002	0.02670
2880.00	3.4722	1.386	0.002	0.009	0.002	0.02670
2885.00	3.4662	1.388	0.003	0.009	0.003	0.02685
2890.00	3.4602	1.388	0.004	0.009	0.004	0.02685
2895.00	3.4542	1.388	0.004	0.009	0.004	0.02695
2900.00	3.4483	1.388	0.006	0.009	0.006	0.02690
2905.00	3.4423	1.386	0.007	0.009	0.007	0.02670
2910.00	3.4364	1.386	0.006	0.009	0.006	0.02665
2915.00	3.4305	1.385	0.005	0.009	0.005	0.02660
2920.00	3.4247	1.387	0.004	0.009	0.004	0.02675
2925.00	3.4188	1.389	0.004	0.009	0.004	0.02700

WN	WL	N	K	DN	DK	R
2930.00	3.4130	1.391	0.004	0.009	0.004	0.02730
2935.00	3.4072	1.394	0.005	0.009	0.005	0.02760
2940.00	3.4014	1.398	0.007	0.009	0.007	0.02805
2945.00	3.3956	1.402	0.011	0.009	0.011	0.02855
2950.00	3.3898	1.407	0.019	0.009	0.011	0.02915
2955.00	3.3841	1.406	0.035	0.010	0.011	0.02925
2960.00	3.3784	1.394	0.050	0.010	0.011	0.02800
2965.00	3.3727	1.372	0.053	0.010	0.011	0.02560
2970.00	3.3670	1.354	0.043	0.010	0.010	0.02340
2975.00	3.3613	1.348	0.028	0.010	0.010	0.02255
2980.00	3.3557	1.350	0.015	0.010	0.009	0.02265
2985.00	3.3501	1.354	0.008	0.009	0.008	0.02310
2990.00	3.3445	1.360	0.005	0.009	0.005	0.02370
2995.00	3.3389	1.363	0.004	0.009	0.004	0.02400
3000.00	3.3333	1.365	0.003	0.009	0.003	0.02425
3005.00	3.3278	1.367	0.002	0.009	0.002	0.02445
3010.00	3.3223	1.368	0.001	0.009	0.001	0.02460
3015.00	3.3167	1.369	0.002	0.009	0.002	0.02475
3020.00	3.3113	1.370	0.001	0.009	0.001	0.02485
3025.00	3.3058	1.371	0.001	0.009	0.001	0.02495
3030.00	3.3003	1.371	0.001	0.009	0.001	0.02500
3035.00	3.2949	1.372	0.001	0.009	0.001	0.02510
3040.00	3.2895	1.373	0.001	0.009	0.001	0.02520
3045.00	3.2841	1.373	0.001	0.009	0.001	0.02520
3050.00	3.2787	1.373	0.001	0.009	0.001	0.02520
3055.00	3.2733	1.374	0.001	0.009	0.001	0.02525
3060.00	3.2680	1.374	0.001	0.009	0.001	0.02530
3065.00	3.2626	1.374	0.001	0.009	0.001	0.02525
3070.00	3.2573	1.375	0.000	0.009	0.000	0.02535
3075.00	3.2520	1.375	0.000	0.009	0.000	0.02545
3080.00	3.2468	1.375	0.001	0.009	0.001	0.02545
3085.00	3.2415	1.375	0.000	0.009	0.000	0.02540
3090.00	3.2362	1.376	0.001	0.009	0.001	0.02550
3095.00	3.2310	1.376	0.001	0.009	0.001	0.02550
3100.00	3.2258	1.376	0.001	0.009	0.001	0.02550
3105.00	3.2206	1.376	0.001	0.009	0.001	0.02550
3110.00	3.2154	1.376	0.001	0.009	0.001	0.02550
3115.00	3.2103	1.377	0.001	0.009	0.001	0.02560
3120.00	3.2051	1.376	0.001	0.009	0.001	0.02555
3125.00	3.2000	1.376	0.001	0.009	0.001	0.02530
3130.00	3.1949	1.376	0.000	0.009	0.000	0.02555
3135.00	3.1898	1.377	0.001	0.009	0.001	0.02560
3140.00	3.1847	1.376	0.000	0.009	0.000	0.02555
3145.00	3.1797	1.377	0.000	0.009	0.000	0.02565
3150.00	3.1746	1.377	0.000	0.009	0.000	0.02565
3155.00	3.1696	1.377	0.000	0.009	0.000	0.02565
3160.00	3.1646	1.377	0.000	0.009	0.001	0.02565
3165.00	3.1596	1.378	0.000	0.009	0.000	0.02570
3170.00	3.1546	1.378	0.000	0.009	0.000	0.02575
3175.00	3.1496	1.378	0.000	0.009	0.000	0.02575

Table 24. Polydimethylsiloxane (SF96).

PAGE 13

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.378	0.000	0.009	0.000	0.02575
3185.00	3.1397	1.378	0.000	0.009	0.000	0.02575
3190.00	3.1348	1.378	0.000	0.009	0.000	0.02575
3195.00	3.1299	1.378	0.000	0.009	0.000	0.02575
3200.00	3.1250	1.378	0.000	0.009	0.000	0.02575
3205.00	3.1201	1.378	0.000	0.009	0.000	0.02580
3210.00	3.1153	1.378	0.000	0.009	0.000	0.02575
3215.00	3.1104	1.378	0.000	0.009	0.001	0.02580
3220.00	3.1056	1.378	0.000	0.009	0.000	0.02580
3225.00	3.1008	1.378	0.000	0.009	0.000	0.02580
3230.00	3.0960	1.379	0.000	0.009	0.000	0.02585
3235.00	3.0912	1.379	0.000	0.009	0.000	0.02585
3240.00	3.0864	1.379	0.000	0.009	0.001	0.02590
3245.00	3.0817	1.379	0.000	0.009	0.000	0.02585
3250.00	3.0769	1.379	0.000	0.009	0.001	0.02585
3255.00	3.0722	1.379	0.000	0.009	0.001	0.02590
3260.00	3.0675	1.379	0.000	0.009	0.000	0.02590
3265.00	3.0628	1.380	0.000	0.009	0.001	0.02595
3270.00	3.0581	1.379	0.000	0.009	0.000	0.02590
3275.00	3.0534	1.380	0.000	0.009	0.001	0.02600
3280.00	3.0488	1.380	0.000	0.009	0.000	0.02595
3285.00	3.0441	1.380	0.000	0.009	0.000	0.02595
3290.00	3.0395	1.380	0.000	0.009	0.000	0.02595
3295.00	3.0349	1.380	0.000	0.009	0.001	0.02595
3300.00	3.0303	1.380	0.000	0.009	0.000	0.02600
3305.00	3.0257	1.380	0.000	0.009	0.000	0.02595
3310.00	3.0211	1.380	0.000	0.009	0.001	0.02595
3315.00	3.0166	1.380	0.000	0.009	0.001	0.02600
3320.00	3.0120	1.381	0.000	0.009	0.001	0.02605
3325.00	3.0075	1.381	0.000	0.009	0.000	0.02605
3330.00	3.0030	1.381	0.000	0.009	0.000	0.02605
3335.00	2.9985	1.381	0.000	0.009	0.000	0.02605
3340.00	2.9940	1.381	0.000	0.009	0.001	0.02605
3345.00	2.9895	1.381	0.000	0.009	0.001	0.02605
3350.00	2.9851	1.381	0.000	0.009	0.000	0.02610
3355.00	2.9806	1.381	0.000	0.009	0.001	0.02610
3360.00	2.9762	1.381	0.000	0.009	0.000	0.02605
3365.00	2.9718	1.381	0.000	0.009	0.001	0.02610
3370.00	2.9674	1.381	0.000	0.009	0.001	0.02605
3375.00	2.9630	1.381	0.000	0.009	0.001	0.02610
3380.00	2.9586	1.382	0.000	0.009	0.001	0.02615
3385.00	2.9542	1.382	0.000	0.009	0.001	0.02620
3390.00	2.9499	1.382	0.000	0.009	0.000	0.02620
3395.00	2.9455	1.382	0.000	0.009	0.001	0.02615
3400.00	2.9412	1.382	0.000	0.009	0.001	0.02625
3405.00	2.9369	1.382	0.000	0.009	0.001	0.02620
3410.00	2.9326	1.382	0.000	0.009	0.001	0.02620
3415.00	2.9283	1.382	0.000	0.009	0.000	0.02620
3420.00	2.9240	1.382	0.000	0.009	0.001	0.02625
3425.00	2.9197	1.382	0.000	0.009	0.001	0.02625

Table 24. Polydimethylsiloxane (SF96).

PAGE 14

WN	WL	N	K	DN	DK	R
3430.00	2.9155	1.382	0.000	0.009	0.000	0.02625
3435.00	2.9112	1.382	0.000	0.009	0.000	0.02620
3440.00	2.9070	1.382	0.000	0.009	0.000	0.02625
3445.00	2.9028	1.382	0.000	0.009	0.000	0.02625
3450.00	2.8986	1.382	0.000	0.009	0.000	0.02620
3455.00	2.8944	1.382	0.000	0.009	0.001	0.02620
3460.00	2.8902	1.383	0.000	0.009	0.001	0.02630
3465.00	2.8860	1.383	0.000	0.009	0.000	0.02630
3470.00	2.8818	1.382	0.000	0.009	0.000	0.02625
3475.00	2.8777	1.382	0.000	0.009	0.000	0.02625
3480.00	2.8736	1.383	0.000	0.009	0.000	0.02630
3485.00	2.8694	1.383	0.000	0.009	0.000	0.02630
3490.00	2.8653	1.383	0.000	0.009	0.000	0.02630
3495.00	2.8612	1.383	0.000	0.009	0.000	0.02630
3500.00	2.8571	1.383	0.000	0.009	0.000	0.02630
3505.00	2.8531	1.383	0.000	0.009	0.000	0.02635
3510.00	2.8490	1.382	0.000	0.009	0.000	0.02625
3515.00	2.8450	1.383	0.000	0.009	0.000	0.02630
3520.00	2.8409	1.382	0.000	0.009	0.000	0.02625
3525.00	2.8369	1.383	0.000	0.009	0.000	0.02635
3530.00	2.8329	1.383	0.000	0.009	0.000	0.02630
3535.00	2.8289	1.383	0.000	0.009	0.001	0.02630
3540.00	2.8249	1.384	0.000	0.009	0.001	0.02640
3545.00	2.8209	1.384	0.000	0.009	0.000	0.02640
3550.00	2.8169	1.383	0.000	0.009	0.001	0.02635
3555.00	2.8129	1.384	0.000	0.009	0.000	0.02645
3560.00	2.8090	1.384	0.000	0.009	0.000	0.02640
3565.00	2.8050	1.384	0.000	0.009	0.000	0.02640
3570.00	2.8011	1.383	0.000	0.009	0.000	0.02635
3575.00	2.7972	1.384	0.000	0.009	0.000	0.02645
3580.00	2.7933	1.384	0.000	0.009	0.000	0.02640
3585.00	2.7894	1.384	0.000	0.009	0.000	0.02645
3590.00	2.7855	1.384	0.000	0.009	0.000	0.02645
3595.00	2.7816	1.384	0.000	0.009	0.000	0.02645
3600.00	2.7778	1.384	0.000	0.009	0.000	0.02640
3605.00	2.7739	1.385	0.000	0.009	0.000	0.02655
3610.00	2.7701	1.385	0.000	0.009	0.000	0.02655
3615.00	2.7663	1.385	0.001	0.009	0.001	0.02655
3620.00	2.7624	1.384	0.001	0.009	0.001	0.02645
3625.00	2.7586	1.384	0.001	0.009	0.001	0.02645
3630.00	2.7548	1.384	0.001	0.009	0.001	0.02645
3635.00	2.7510	1.384	0.001	0.009	0.001	0.02645
3640.00	2.7473	1.385	0.000	0.009	0.000	0.02655
3645.00	2.7435	1.384	0.001	0.009	0.001	0.02645
3650.00	2.7397	1.384	0.001	0.009	0.001	0.02645
3655.00	2.7360	1.384	0.001	0.009	0.001	0.02645
3660.00	2.7322	1.384	0.001	0.009	0.001	0.02645
3665.00	2.7285	1.384	0.001	0.009	0.001	0.02645
3670.00	2.7248	1.384	0.000	0.009	0.000	0.02645
3675.00	2.7211	1.385	0.001	0.009	0.001	0.02655

Table 24. Polydimethylsiloxane (SF96).

PAGE 15

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.384	0.001	0.009	0.001	0.02640
3685.00	2.7137	1.384	0.001	0.009	0.001	0.02645
3690.00	2.7100	1.384	0.001	0.009	0.001	0.02645
3695.00	2.7064	1.384	0.001	0.009	0.001	0.02645
3700.00	2.7027	1.384	0.001	0.009	0.001	0.02645
3705.00	2.6991	1.384	0.001	0.009	0.001	0.02645
3710.00	2.6954	1.384	0.001	0.009	0.001	0.02645
3715.00	2.6918	1.384	0.001	0.009	0.001	0.02645
3720.00	2.6882	1.384	0.001	0.009	0.001	0.02645
3725.00	2.6846	1.384	0.000	0.009	0.000	0.02640
3730.00	2.6810	1.384	0.001	0.009	0.001	0.02645
3735.00	2.6774	1.384	0.001	0.009	0.001	0.02640
3740.00	2.6738	1.383	0.001	0.009	0.001	0.02635
3745.00	2.6702	1.384	0.000	0.009	0.000	0.02640
3750.00	2.6667	1.383	0.001	0.009	0.001	0.02635
3755.00	2.6631	1.383	0.000	0.009	0.000	0.02635
3760.00	2.6596	1.384	0.000	0.009	0.000	0.02645
3765.00	2.6560	1.384	0.000	0.009	0.000	0.02645
3770.00	2.6525	1.384	0.000	0.009	0.000	0.02640
3775.00	2.6490	1.384	0.000	0.009	0.000	0.02645
3780.00	2.6455	1.384	0.000	0.009	0.000	0.02640
3785.00	2.6420	1.384	0.000	0.009	0.000	0.02640
3790.00	2.6385	1.384	0.000	0.009	0.000	0.02645
3795.00	2.6350	1.384	0.000	0.009	0.000	0.02645
3800.00	2.6316	1.384	0.000	0.009	0.001	0.02645
3805.00	2.6281	1.384	0.000	0.009	0.001	0.02645
3810.00	2.6247	1.384	0.000	0.009	0.000	0.02645
3815.00	2.6212	1.385	0.000	0.009	0.001	0.02655
3820.00	2.6178	1.384	0.000	0.009	0.000	0.02645
3825.00	2.6144	1.384	0.000	0.009	0.001	0.02645
3830.00	2.6110	1.384	0.000	0.009	0.001	0.02645
3835.00	2.6076	1.384	0.000	0.009	0.001	0.02640
3840.00	2.6042	1.385	0.000	0.009	0.002	0.02635
3845.00	2.6008	1.385	0.000	0.009	0.001	0.02655
3850.00	2.5974	1.385	0.000	0.009	0.001	0.02655
3855.00	2.5940	1.385	0.000	0.009	0.001	0.02655
3860.00	2.5907	1.385	0.000	0.009	0.001	0.02655
3865.00	2.5873	1.385	0.000	0.009	0.001	0.02655
3870.00	2.5840	1.385	0.000	0.009	0.001	0.02655
3875.00	2.5806	1.385	0.000	0.009	0.001	0.02660
3880.00	2.5773	1.385	0.000	0.009	0.001	0.02660
3885.00	2.5740	1.385	0.000	0.009	0.002	0.02655
3890.00	2.5707	1.385	0.000	0.009	0.002	0.02660
3895.00	2.5674	1.386	0.000	0.009	0.002	0.02665
3900.00	2.5641	1.385	0.000	0.009	0.001	0.02660
3905.00	2.5608	1.385	0.000	0.009	0.001	0.02655
3910.00	2.5575	1.385	0.000	0.009	0.002	0.02660
3915.00	2.5543	1.386	0.000	0.009	0.002	0.02665
3920.00	2.5510	1.386	0.000	0.009	0.002	0.02665
3925.00	2.5478	1.386	0.000	0.009	0.001	0.02665



Table 24. Polydimethylsiloxane (SF96).

PAGE 16

WN	WL	N	K	DN	DK	R
3930.00	2.5445	1.386	0.000	0.009	0.001	0.02665
3935.00	2.5413	1.385	0.000	0.009	0.002	0.02660
3940.00	2.5381	1.385	0.000	0.009	0.002	0.02660
3945.00	2.5349	1.385	0.000	0.009	0.002	0.02660
3950.00	2.5316	1.386	0.000	0.009	0.002	0.02665
3955.00	2.5284	1.386	0.000	0.009	0.002	0.02665
3960.00	2.5253	1.386	0.000	0.009	0.002	0.02665
3965.00	2.5221	1.386	0.000	0.009	0.002	0.02665
3970.00	2.5189	1.386	0.000	0.009	0.002	0.02670
3975.00	2.5157	1.386	0.000	0.009	0.002	0.02665
3980.00	2.5126	1.386	0.000	0.009	0.003	0.02670
3985.00	2.5094	1.386	0.000	0.009	0.002	0.02670
3990.00	2.5063	1.386	0.000	0.009	0.003	0.02665
3995.00	2.5031	1.386	0.000	0.009	0.003	0.02665
4000.00	2.5000	1.386	0.000	0.009	0.004	0.02670

Table 24. Polydimethylsiloxane (SF96).

PAGE 17

WN	WL	N	K	R
4001.60	2.4990	1.391	.0001680	0.02722
4033.68	2.4790	1.391	.0002400	0.02724
4066.69	2.4590	1.391	.0002640	0.02724
4100.04	2.4390	1.391	.0001380	0.02726
4133.94	2.4190	1.391	.0001240	0.02728
4168.40	2.3990	1.391	.0002310	0.02730
4203.45	2.3790	1.392	.0003160	0.02733
4239.08	2.3590	1.391	.0002190	0.02730
4275.33	2.3390	1.392	.0001050	0.02734
4312.20	2.3190	1.392	.0001560	0.02737
4349.72	2.2990	1.392	.0006460	0.02739
4387.89	2.2790	1.392	.0003560	0.02734
4426.74	2.2590	1.392	.0001720	0.02736
4466.28	2.2390	1.392	.0001080	0.02738
4506.53	2.2190	1.392	.0000830	0.02740
4547.52	2.1990	1.392	.0000490	0.02742
4589.26	2.1790	1.393	.0000340	0.02743
4631.77	2.1590	1.393	.0000220	0.02745
4675.08	2.1390	1.393	.0000110	0.02747
4719.21	2.1190	1.393	.0000080	0.02748
4764.17	2.0990	1.393	.0000060	0.02750
4810.00	2.0790	1.393	.0000050	0.02751
4856.73	2.0590	1.393	.0000060	0.02753
4904.36	2.0390	1.394	.0000090	0.02754
4952.95	2.0190	1.394	.0000100	0.02755
5002.50	1.9990	1.394	.0000100	0.02757
5053.06	1.9790	1.394	.0000100	0.02758
5104.65	1.9590	1.394	.0000080	0.02759
5157.30	1.9390	1.394	.0000060	0.02761
5211.05	1.9190	1.394	.0000040	0.02762
5265.93	1.8990	1.394	.0000030	0.02763
5321.98	1.8790	1.394	.0000020	0.02765
5379.24	1.8590	1.395	.0000120	0.02766
5437.74	1.8390	1.395	.0000200	0.02767
5497.53	1.8190	1.395	.0000040	0.02768
5558.64	1.7990	1.395	.0000100	0.02770
5621.14	1.7790	1.395	.0000310	0.02771
5685.05	1.7590	1.395	.0000410	0.02773
5750.43	1.7390	1.395	.0000950	0.02773
5817.34	1.7190	1.395	.0000200	0.02774
5885.81	1.6990	1.395	.0000890	0.02775
5955.93	1.6790	1.395	.0000210	0.02776
6027.73	1.6590	1.396	.0000080	0.02778
6101.28	1.6390	1.396	.0000050	0.02779
6176.65	1.6190	1.396	.0000010	0.02780
6253.91	1.5990	1.396	.0000010	0.02781
6333.12	1.5790	1.396	.0000010	0.02783
6414.37	1.5590	1.396	.0000040	0.02784
6497.73	1.5390	1.396	.0000050	0.02785
6583.28	1.5190	1.396	.0000060	0.02786

Table 24. Polydimethylsiloxane (SF96).

PAGE 18

WN	WL	N	K	R
6671.11	1.4990	1.396	.0000020	0.02787
6761.33	1.4790	1.396	.0000010	0.02788
6854.01	1.4590	1.397	.0000020	0.02790
6949.27	1.4390	1.397	.0000030	0.02791
7047.22	1.4190	1.397	.0000050	0.02792
7147.96	1.3990	1.397	.0000150	0.02793
7251.63	1.3790	1.397	.0000060	0.02794
7358.35	1.3590	1.397	.0000030	0.02795
7468.26	1.3390	1.397	.0000000	0.02797
7581.50	1.3190	1.397	.0000000	0.02798
7698.23	1.2990	1.397	.0000000	0.02799
7818.61	1.2790	1.397	.0000000	0.02800
7942.81	1.2590	1.398	.0000010	0.02801
8071.02	1.2390	1.398	.0000000	0.02802
8203.45	1.2190	1.398	.0000010	0.02804
8340.28	1.1990	1.398	.0000030	0.02805
8481.76	1.1790	1.398	.0000120	0.02806
8628.13	1.1590	1.398	.0000030	0.02807
8779.63	1.1390	1.398	.0000010	0.02809
8936.55	1.1190	1.398	.0000010	0.02810
9099.18	1.0990	1.398	.0000010	0.02811
9267.84	1.0790	1.398	.0000010	0.02812
9442.87	1.0590	1.399	.0000010	0.02813
9624.64	1.0390	1.399	.0000010	0.02815
9813.54	1.0190	1.399	.0000010	0.02816
10010.00	0.9990	1.399	.0000010	0.02817
10214.50	0.9790	1.399	.0000010	0.02818
10427.50	0.9590	1.399	.0000010	0.02820
10649.60	0.9390	1.399	.0000010	0.02821
10881.40	0.9190	1.399	.0000010	0.02823
11123.50	0.8990	1.399	.0000010	0.02824
11376.60	0.8790	1.400	.0000010	0.02826
11641.40	0.8590	1.400	.0000010	0.02827
11919.00	0.8390	1.400	.0000020	0.02828
12210.00	0.8190	1.400	.0000010	0.02830

#### 4.21 Dimethyl methyl Phosphonate (DMMP).

DMMP [ $\text{CH}_3\text{P}(\text{O})(\text{OCH}_3)_2$ ] of 99% purity was acquired from Aldrich Chemical Co.

The acquisition of reflectance spectra in the  $180\text{--}4000\text{ cm}^{-1}$  wave-number region, and transmittance spectra in the  $800\text{--}2500\text{ nm}$  wavelength region, was similar to that described for SF-96 in Section 4.20. The reflectance and transmittance spectra, were analyzed similar to those for SF-96 to determine  $n$  and  $k$ .

Results of the investigations of the optical properties DMMP are presented in Figures 44 and 45 and in Table 25.

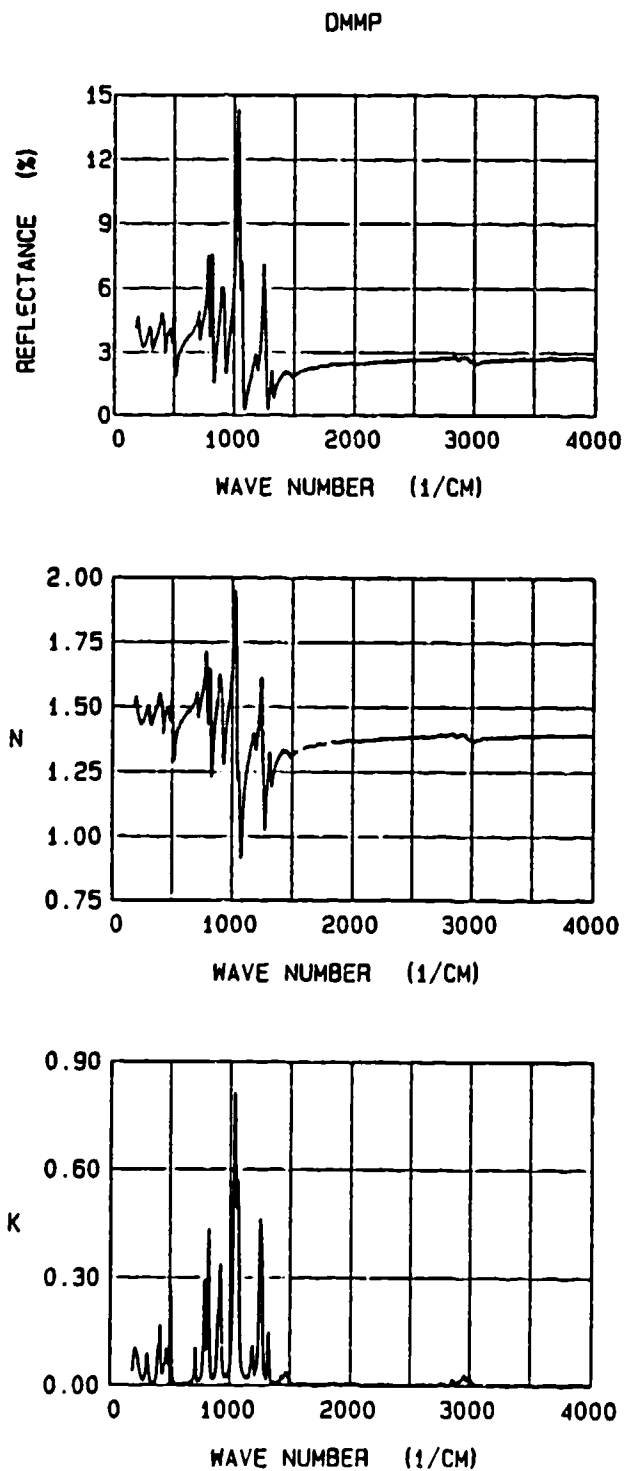


Figure 44. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of DMMP. The  $N$  and  $K$  spectra are from Kramers-Kronig analysis of the reflectance spectrum.

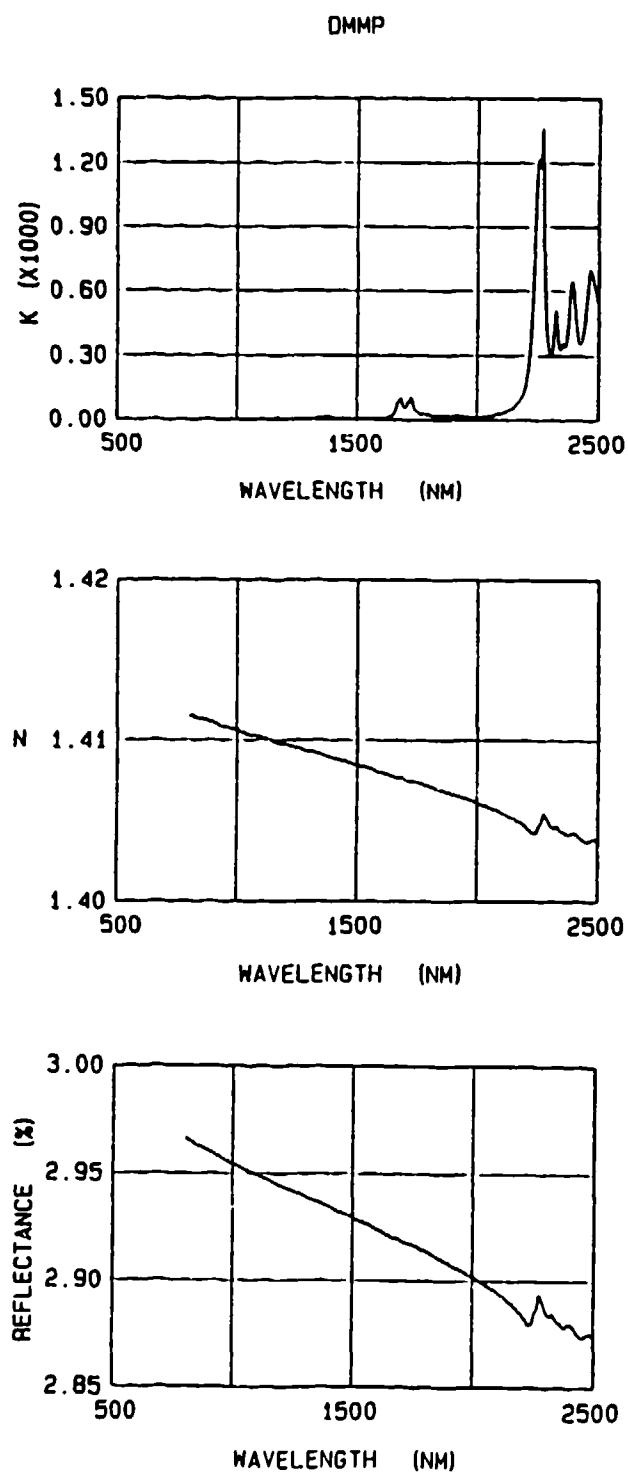


Figure 45. The extinction coefficient  $K$  and refractive index  $N$  spectra of DMMP in the 800-2,500 nm region. The  $N$  spectrum is from Kramers-Kronig analysis of the  $K$  spectrum. Reflectance was computed from  $N$  and  $K$ .

Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	1.504	0.044	0.014	0.015	0.04154
190.00	52.6316	1.530	0.045	0.009	0.016	0.04498
200.00	50.0000	1.508	0.095	0.011	0.016	0.04309
210.00	47.6190	1.471	0.102	0.011	0.015	0.03858
220.00	45.4545	1.457	0.094	0.011	0.014	0.03666
230.00	43.4783	1.437	0.075	0.010	0.013	0.03370
240.00	41.6667	1.430	0.047	0.010	0.013	0.03221
250.00	40.0000	1.434	0.033	0.009	0.013	0.03254
260.00	38.4615	1.447	0.019	0.009	0.013	0.03404
270.00	37.0370	1.460	0.014	0.009	0.013	0.03562
280.00	35.7143	1.480	0.016	0.008	0.014	0.03815
290.00	34.4828	1.496	0.028	0.009	0.014	0.04030
300.00	33.3333	1.503	0.062	0.010	0.015	0.04163
310.00	32.2581	1.455	0.086	0.011	0.014	0.03622
320.00	31.2500	1.424	0.044	0.010	0.012	0.03148
330.00	30.3030	1.437	0.017	0.009	0.012	0.03281
340.00	29.4118	1.456	0.007	0.008	0.007	0.03506
350.00	28.5714	1.470	0.004	0.008	0.004	0.03691
360.00	27.7778	1.483	0.002	0.008	0.002	0.03851
370.00	27.0270	1.502	0.006	0.008	0.006	0.04098
380.00	26.3158	1.524	0.016	0.008	0.015	0.04388
390.00	25.6410	1.550	0.049	0.009	0.016	0.04771
400.00	25.0000	1.527	0.111	0.011	0.017	0.04607
410.00	24.3902	1.520	0.126	0.011	0.017	0.04568
420.00	23.8095	1.393	0.109	0.011	0.013	0.02948
430.00	23.2558	1.437	0.035	0.009	0.013	0.03298
440.00	22.7273	1.472	0.034	0.009	0.014	0.03731
450.00	22.2222	1.484	0.053	0.010	0.014	0.03908
460.00	21.7391	1.495	0.075	0.010	0.015	0.04096
470.00	21.2766	1.461	0.099	0.011	0.015	0.03735
480.00	20.8333	1.458	0.061	0.010	0.014	0.03592
490.00	20.4082	1.515	0.074	0.010	0.016	0.04343
500.00	20.0000	1.455	0.269	0.014	0.016	0.04660
510.00	19.6078	1.288	0.105	0.012	0.011	0.01829
520.00	19.2308	1.349	0.012	0.010	0.010	0.02252
530.00	18.8679	1.381	0.007	0.009	0.007	0.02610
540.00	18.5185	1.410	0.003	0.009	0.003	0.02950
550.00	18.1818	1.419	0.002	0.008	0.002	0.03053
560.00	17.8571	1.433	0.000	0.008	0.001	0.03225
570.00	17.5439	1.438	0.000	0.008	0.004	0.03286
580.00	17.2414	1.446	0.000	0.008	0.004	0.03386
590.00	16.9492	1.453	0.000	0.008	0.001	0.03472
600.00	16.6667	1.463	0.004	0.008	0.004	0.03599
610.00	16.3934	1.463	0.004	0.008	0.004	0.03592
620.00	16.1290	1.478	0.006	0.008	0.006	0.03793
630.00	15.8730	1.478	0.006	0.008	0.006	0.03783
640.00	15.6250	1.478	0.007	0.008	0.007	0.03781
650.00	15.3846	1.486	0.005	0.008	0.005	0.03886
660.00	15.1515	1.490	0.005	0.008	0.005	0.03936
670.00	14.9254	1.505	0.009	0.008	0.009	0.04134

Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 2

WN	WL	N	K	DN	DK	R
680.00	14.7059	1.509	0.012	0.008	0.012	0.04189
690.00	14.4928	1.523	0.014	0.008	0.014	0.04367
700.00	14.2857	1.541	0.030	0.009	0.016	0.04619
710.00	14.0845	1.550	0.105	0.011	0.017	0.04896
720.00	13.8889	1.459	0.039	0.009	0.013	0.03566
730.00	13.6986	1.495	0.012	0.008	0.012	0.04003
740.00	13.5135	1.524	0.012	0.008	0.012	0.04390
750.00	13.3333	1.545	0.015	0.008	0.015	0.04662
760.00	13.1579	1.576	0.016	0.008	0.016	0.05081
770.00	12.9870	1.623	0.037	0.009	0.019	0.05750
780.00	12.8205	1.712	0.134	0.012	0.023	0.07232
790.00	12.6582	1.476	0.294	0.015	0.017	0.05118
800.00	12.5000	1.481	0.098	0.011	0.015	0.03973
810.00	12.3457	1.647	0.161	0.013	0.021	0.06425
820.00	12.1951	1.404	0.435	0.017	0.014	0.06007
830.00	12.0482	1.247	0.122	0.012	0.011	0.01532
840.00	11.9048	1.367	0.034	0.010	0.011	0.02474
850.00	11.7647	1.428	0.021	0.009	0.012	0.03172
860.00	11.6279	1.470	0.024	0.009	0.013	0.03694
870.00	11.4943	1.518	0.024	0.008	0.015	0.04317
880.00	11.3636	1.563	0.044	0.009	0.017	0.04934
890.00	11.2360	1.624	0.130	0.012	0.020	0.05980
900.00	11.1111	1.569	0.210	0.014	0.019	0.05629
910.00	10.9890	1.515	0.317	0.016	0.018	0.05783
920.00	10.8696	1.304	0.265	0.013	0.013	0.03081
930.00	10.7527	1.306	0.082	0.012	0.011	0.01925
940.00	10.6383	1.386	0.031	0.010	0.011	0.02678
950.00	10.5263	1.434	0.022	0.009	0.012	0.03251
960.00	10.4167	1.484	0.021	0.009	0.014	0.03875
970.00	10.3093	1.520	0.023	0.008	0.015	0.04335
980.00	10.2041	1.560	0.030	0.009	0.017	0.04882
990.00	10.1010	1.618	0.042	0.009	0.019	0.05690
1000.00	10.0000	1.695	0.066	0.009	0.022	0.06805
1010.00	9.9010	1.820	0.144	0.012	0.027	0.08821
1020.00	9.8039	1.948	0.421	0.024	0.033	0.12290
1030.00	9.7087	1.656	0.813	0.032	0.017	0.14326
1040.00	9.6154	1.247	0.673	0.019	0.006	0.09496
1050.00	9.5238	1.252	0.493	0.015	0.009	0.05874
1060.00	9.4340	1.135	0.573	0.015	0.005	0.07221
1070.00	9.3458	0.914	0.357	0.009	0.008	0.03643
1080.00	9.2593	1.007	0.119	0.003	0.017	0.00363
1090.00	9.1743	1.103	0.061	0.018	0.013	0.00331
1100.00	9.0909	1.174	0.035	0.015	0.007	0.00682
1110.00	9.0090	1.215	0.031	0.013	0.007	0.00979
1120.00	8.9286	1.251	0.020	0.012	0.007	0.01274
1130.00	8.8496	1.280	0.019	0.011	0.008	0.01547
1140.00	8.7719	1.301	0.024	0.011	0.009	0.01760
1150.00	8.6957	1.332	0.018	0.010	0.009	0.02071
1160.00	8.6207	1.360	0.035	0.010	0.010	0.02395
1170.00	8.5470	1.385	0.050	0.010	0.012	0.02697



Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 3

WN	WL	N	K	DN	DK	R
1180.00	8.4746	1.384	0.095	0.011	0.013	0.02802
1190.00	8.4034	1.336	0.095	0.012	0.012	0.02271
1200.00	8.3333	1.352	0.045	0.010	0.011	0.02313
1210.00	8.2645	1.393	0.040	0.010	0.012	0.02772
1220.00	8.1967	1.455	0.043	0.009	0.013	0.03531
1230.00	8.1301	1.558	0.104	0.011	0.017	0.04992
1240.00	8.0645	1.588	0.361	0.018	0.020	0.07083
1250.00	8.0000	1.301	0.444	0.015	0.011	0.05326
1260.00	7.9365	1.116	0.380	0.010	0.007	0.03481
1270.00	7.8740	1.036	0.130	0.006	0.016	0.00446
1280.00	7.8125	1.150	0.032	0.016	0.007	0.00520
1290.00	7.7519	1.224	0.025	0.013	0.007	0.01046
1300.00	7.6923	1.280	0.028	0.011	0.008	0.01550
1310.00	7.6336	1.306	0.131	0.012	0.012	0.02120
1320.00	7.5758	1.191	0.097	0.013	0.011	0.00979
1330.00	7.5188	1.204	0.019	0.013	0.006	0.00882
1340.00	7.4627	1.238	0.005	0.012	0.005	0.01154
1350.00	7.4074	1.260	0.000	0.011	0.001	0.01353
1360.00	7.3529	1.275	0.010	0.011	0.007	0.01495
1370.00	7.2993	1.287	0.001	0.010	0.001	0.01611
1380.00	7.2464	1.297	0.003	0.010	0.003	0.01706
1390.00	7.1942	1.305	0.008	0.010	0.008	0.01784
1400.00	7.1429	1.311	0.000	0.010	0.004	0.01848
1410.00	7.0922	1.326	0.008	0.010	0.008	0.02004
1420.00	7.0423	1.321	0.026	0.010	0.009	0.01963
1430.00	6.9930	1.323	0.017	0.010	0.009	0.01974
1440.00	6.9444	1.332	0.019	0.010	0.009	0.02075
1450.00	6.8966	1.331	0.028	0.010	0.010	0.02070
1460.00	6.8493	1.323	0.036	0.011	0.010	0.01994
1470.00	6.8027	1.312	0.033	0.011	0.009	0.01879
1480.00	6.7568	1.306	0.023	0.011	0.009	0.01803
1490.00	6.7114	1.308	0.013	0.010	0.008	0.01818
1500.00	6.6667	1.313	0.008	0.010	0.006	0.01873
1510.00	6.6225	1.318	0.005	0.010	0.005	0.01922
1520.00	6.5789	1.323	0.003	0.010	0.003	0.01966
1530.00	6.5359	1.325	0.002	0.010	0.002	0.01994
1540.00	6.4935	1.329	0.000	0.010	0.000	0.02038
1550.00	6.4516	1.333	0.001	0.010	0.001	0.02076
1560.00	6.4103	1.335	0.002	0.010	0.002	0.02095
1570.00	6.3694	1.336	0.003	0.010	0.003	0.02106
1580.00	6.3291	1.336	0.001	0.009	0.001	0.02114
1590.00	6.2893	1.338	0.000	0.009	0.000	0.02131
1600.00	6.2500	1.342	0.000	0.009	0.000	0.02169
1610.00	6.2112	1.343	0.001	0.009	0.001	0.02189
1620.00	6.1728	1.344	0.001	0.009	0.001	0.02198
1630.00	6.1350	1.345	0.001	0.009	0.001	0.02205
1640.00	6.0976	1.346	0.001	0.009	0.001	0.02215
1650.00	6.0606	1.346	0.001	0.009	0.001	0.02219
1660.00	6.0241	1.347	0.000	0.009	0.000	0.02223
1670.00	5.9880	1.347	0.000	0.009	0.001	0.02233

Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 4

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.350	0.000	0.009	0.002	0.02262
1690.00	5.9172	1.352	0.000	0.009	0.003	0.02283
1700.00	5.8824	1.355	0.000	0.009	0.002	0.02315
1710.00	5.8480	1.356	0.000	0.009	0.000	0.02325
1720.00	5.8140	1.356	0.000	0.009	0.000	0.02331
1730.00	5.7803	1.356	0.001	0.009	0.001	0.02331
1740.00	5.7471	1.357	0.001	0.009	0.001	0.02340
1750.00	5.7143	1.357	0.002	0.009	0.002	0.02335
1760.00	5.6818	1.356	0.001	0.009	0.001	0.02330
1770.00	5.6497	1.357	0.000	0.009	0.001	0.02341
1780.00	5.6180	1.360	0.000	0.009	0.002	0.02369
1790.00	5.5866	1.362	0.000	0.009	0.002	0.02391
1800.00	5.5556	1.363	0.000	0.009	0.000	0.02410
1810.00	5.5249	1.364	0.001	0.009	0.001	0.02416
1820.00	5.4945	1.363	0.002	0.009	0.002	0.02410
1830.00	5.4645	1.364	0.002	0.009	0.002	0.02418
1840.00	5.4348	1.365	0.002	0.009	0.002	0.02427
1850.00	5.4054	1.365	0.003	0.009	0.003	0.02430
1860.00	5.3763	1.364	0.004	0.009	0.004	0.02415
1870.00	5.3476	1.363	0.003	0.009	0.003	0.02405
1880.00	5.3191	1.363	0.003	0.009	0.003	0.02407
1890.00	5.2910	1.363	0.001	0.009	0.001	0.02407
1900.00	5.2632	1.364	0.000	0.009	0.000	0.02420
1910.00	5.2356	1.367	0.000	0.009	0.001	0.02448
1920.00	5.2083	1.368	0.001	0.009	0.001	0.02461
1930.00	5.1813	1.367	0.002	0.009	0.002	0.02455
1940.00	5.1546	1.368	0.001	0.009	0.001	0.02460
1950.00	5.1282	1.369	0.001	0.009	0.001	0.02474
1960.00	5.1020	1.370	0.003	0.009	0.003	0.02478
1970.00	5.0761	1.369	0.004	0.009	0.004	0.02471
1980.00	5.0505	1.368	0.003	0.009	0.003	0.02466
1990.00	5.0251	1.370	0.003	0.009	0.003	0.02483
2000.00	5.0000	1.370	0.005	0.009	0.005	0.02483
2010.00	4.9751	1.368	0.006	0.009	0.006	0.02461
2020.00	4.9505	1.367	0.004	0.009	0.004	0.02445
2030.00	4.9261	1.367	0.002	0.009	0.002	0.02450
2040.00	4.9020	1.368	0.002	0.009	0.002	0.02460
2050.00	4.8780	1.368	0.002	0.009	0.002	0.02465
2060.00	4.8544	1.367	0.002	0.009	0.002	0.02454
2070.00	4.8309	1.369	0.001	0.009	0.001	0.02471
2080.00	4.8077	1.368	0.001	0.009	0.001	0.02461
2090.00	4.7847	1.369	0.000	0.009	0.000	0.02475
2100.00	4.7619	1.371	0.000	0.009	0.000	0.02491
2110.00	4.7393	1.371	0.000	0.009	0.001	0.02490
2120.00	4.7170	1.371	0.000	0.009	0.000	0.02498
2130.00	4.6948	1.371	0.000	0.009	0.000	0.02494
2140.00	4.6729	1.372	0.000	0.009	0.001	0.02507
2150.00	4.6512	1.372	0.000	0.009	0.000	0.02503
2160.00	4.6296	1.374	0.000	0.009	0.001	0.02524
2170.00	4.6083	1.373	0.001	0.009	0.001	0.02513

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.372	0.000	0.009	0.000	0.02505
2190.00	4.5662	1.373	0.000	0.009	0.001	0.02515
2200.00	4.5455	1.373	0.000	0.009	0.001	0.02519
2210.00	4.5249	1.374	0.000	0.009	0.001	0.02525
2220.00	4.5045	1.374	0.000	0.009	0.001	0.02524
2230.00	4.4843	1.375	0.000	0.009	0.003	0.02536
2240.00	4.4643	1.376	0.000	0.009	0.002	0.02553
2250.00	4.4444	1.377	0.000	0.009	0.001	0.02565
2260.00	4.4248	1.376	0.001	0.009	0.001	0.02553
2270.00	4.4053	1.375	0.000	0.009	0.001	0.02542
2280.00	4.3860	1.377	0.000	0.009	0.001	0.02559
2290.00	4.3668	1.377	0.000	0.009	0.001	0.02565
2300.00	4.3478	1.378	0.000	0.009	0.000	0.02570
2310.00	4.3290	1.377	0.000	0.009	0.001	0.02565
2320.00	4.3103	1.377	0.000	0.009	0.001	0.02561
2330.00	4.2918	1.376	0.000	0.009	0.001	0.02550
2340.00	4.2735	1.377	0.000	0.009	0.002	0.02563
2350.00	4.2553	1.376	0.000	0.009	0.003	0.02578
2360.00	4.2373	1.380	0.000	0.009	0.000	0.02596
2370.00	4.2194	1.379	0.000	0.009	0.000	0.02585
2380.00	4.2017	1.378	0.000	0.009	0.001	0.02577
2390.00	4.1841	1.380	0.000	0.009	0.002	0.02593
2400.00	4.1667	1.381	0.000	0.009	0.001	0.02603
2410.00	4.1494	1.381	0.000	0.009	0.000	0.02609
2420.00	4.1322	1.380	0.001	0.009	0.001	0.02596
2430.00	4.1152	1.379	0.001	0.009	0.001	0.02585
2440.00	4.0984	1.379	0.000	0.009	0.001	0.02580
2450.00	4.0816	1.381	0.000	0.009	0.002	0.02607
2460.00	4.0650	1.382	0.000	0.009	0.001	0.02620
2470.00	4.0486	1.381	0.000	0.009	0.000	0.02607
2480.00	4.0323	1.380	0.000	0.009	0.000	0.02600
2490.00	4.0161	1.381	0.000	0.009	0.001	0.02609
2500.00	4.0000	1.382	0.000	0.009	0.001	0.02620
2510.00	3.9841	1.382	0.000	0.009	0.000	0.02618
2520.00	3.9683	1.382	0.000	0.009	0.000	0.02620
2530.00	3.9526	1.381	0.000	0.009	0.000	0.02610
2540.00	3.9370	1.381	0.000	0.009	0.001	0.02606
2550.00	3.9216	1.382	0.000	0.009	0.003	0.02624
2560.00	3.9063	1.385	0.000	0.009	0.003	0.02653
2570.00	3.8911	1.385	0.000	0.009	0.001	0.02655
2580.00	3.8760	1.383	0.000	0.009	0.001	0.02636
2590.00	3.8610	1.385	0.000	0.009	0.001	0.02657
2600.00	3.8462	1.386	0.001	0.009	0.001	0.02665
2610.00	3.8314	1.384	0.003	0.009	0.003	0.02648
2620.00	3.8168	1.382	0.001	0.009	0.001	0.02626
2630.00	3.8023	1.384	0.000	0.009	0.001	0.02640
2640.00	3.7879	1.385	0.000	0.009	0.002	0.02657
2650.00	3.7736	1.387	0.000	0.009	0.000	0.02674
2660.00	3.7594	1.385	0.001	0.009	0.001	0.02660
2670.00	3.7453	1.385	0.001	0.009	0.001	0.02657

Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 6

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.384	0.001	0.009	0.001	0.02641
2690.00	3.7175	1.384	0.000	0.009	0.002	0.02646
2700.00	3.7037	1.387	0.000	0.009	0.002	0.02674
2710.00	3.6900	1.389	0.000	0.009	0.002	0.02703
2720.00	3.6765	1.389	0.000	0.009	0.001	0.02701
2730.00	3.6630	1.389	0.000	0.009	0.000	0.02705
2740.00	3.6496	1.391	0.002	0.009	0.002	0.02719
2750.00	3.6364	1.390	0.003	0.009	0.003	0.02709
2760.00	3.6232	1.388	0.004	0.009	0.004	0.02684
2770.00	3.6101	1.387	0.002	0.009	0.002	0.02679
2780.00	3.5971	1.388	0.000	0.009	0.000	0.02693
2790.00	3.5842	1.391	0.000	0.009	0.000	0.02720
2800.00	3.5714	1.392	0.002	0.009	0.002	0.02736
2810.00	3.5587	1.392	0.002	0.009	0.002	0.02733
2820.00	3.5461	1.393	0.001	0.009	0.001	0.02749
2830.00	3.5336	1.398	0.003	0.009	0.003	0.02806
2840.00	3.5211	1.400	0.011	0.009	0.011	0.02834
2850.00	3.5088	1.392	0.016	0.009	0.011	0.02746
2860.00	3.4965	1.386	0.014	0.009	0.011	0.02672
2870.00	3.4843	1.383	0.008	0.009	0.008	0.02634
2880.00	3.4722	1.389	0.005	0.009	0.005	0.02700
2890.00	3.4602	1.391	0.006	0.009	0.006	0.02726
2900.00	3.4483	1.394	0.008	0.009	0.008	0.02758
2910.00	3.4364	1.394	0.012	0.009	0.011	0.02761
2920.00	3.4247	1.393	0.013	0.009	0.011	0.02750
2930.00	3.4130	1.395	0.015	0.009	0.011	0.02775
2940.00	3.4014	1.394	0.023	0.009	0.011	0.02772
2950.00	3.3898	1.387	0.029	0.010	0.011	0.02691
2960.00	3.3784	1.376	0.026	0.010	0.011	0.02568
2970.00	3.3670	1.373	0.018	0.009	0.010	0.02527
2980.00	3.3557	1.377	0.015	0.009	0.010	0.02565
2990.00	3.3445	1.376	0.018	0.009	0.010	0.02559
3000.00	3.3333	1.370	0.018	0.009	0.010	0.02490
3010.00	3.3223	1.367	0.013	0.009	0.010	0.02450
3020.00	3.3113	1.367	0.007	0.009	0.007	0.02446
3030.00	3.3003	1.369	0.004	0.009	0.004	0.02474
3040.00	3.2895	1.371	0.002	0.009	0.002	0.02498
3050.00	3.2787	1.374	0.001	0.009	0.001	0.02524
3060.00	3.2680	1.375	0.000	0.009	0.000	0.02536
3070.00	3.2573	1.377	0.000	0.009	0.001	0.02560
3080.00	3.2468	1.377	0.000	0.009	0.000	0.02565
3090.00	3.2362	1.379	0.000	0.009	0.000	0.02591
3100.00	3.2258	1.379	0.001	0.009	0.001	0.02581
3110.00	3.2154	1.379	0.001	0.009	0.001	0.02583
3120.00	3.2051	1.378	0.001	0.009	0.001	0.02577
3130.00	3.1949	1.378	0.000	0.009	0.001	0.02577
3140.00	3.1847	1.380	0.000	0.009	0.002	0.02594
3150.00	3.1746	1.383	0.000	0.009	0.001	0.02626
3160.00	3.1646	1.382	0.000	0.009	0.000	0.02615
3170.00	3.1546	1.381	0.001	0.009	0.001	0.02613

Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 7

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.379	0.000	0.009	0.000	0.02591
3190.00	3.1348	1.380	0.000	0.009	0.001	0.02595
3200.00	3.1250	1.382	0.000	0.009	0.003	0.02615
3210.00	3.1153	1.384	0.000	0.009	0.002	0.02640
3220.00	3.1056	1.383	0.000	0.009	0.000	0.02630
3230.00	3.0960	1.382	0.000	0.009	0.000	0.02622
3240.00	3.0864	1.383	0.000	0.009	0.002	0.02629
3250.00	3.0769	1.384	0.000	0.009	0.001	0.02648
3260.00	3.0675	1.383	0.000	0.009	0.000	0.02636
3270.00	3.0581	1.384	0.000	0.009	0.001	0.02646
3280.00	3.0488	1.384	0.000	0.009	0.000	0.02645
3290.00	3.0395	1.385	0.001	0.009	0.001	0.02651
3300.00	3.0303	1.382	0.001	0.009	0.001	0.02620
3310.00	3.0211	1.381	0.000	0.009	0.001	0.02610
3320.00	3.0120	1.383	0.000	0.009	0.003	0.02628
3330.00	3.0030	1.385	0.000	0.009	0.003	0.02656
3340.00	2.9940	1.385	0.000	0.009	0.001	0.02650
3350.00	2.9851	1.385	0.000	0.009	0.000	0.02656
3360.00	2.9762	1.383	0.000	0.009	0.001	0.02627
3370.00	2.9674	1.384	0.000	0.009	0.002	0.02645
3380.00	2.9586	1.384	0.000	0.009	0.001	0.02648
3390.00	2.9499	1.385	0.000	0.009	0.003	0.02659
3400.00	2.9412	1.386	0.000	0.009	0.003	0.02664
3410.00	2.9326	1.389	0.000	0.009	0.003	0.02695
3420.00	2.9240	1.388	0.001	0.009	0.001	0.02689
3430.00	2.9155	1.384	0.000	0.009	0.000	0.02644
3440.00	2.9070	1.384	0.000	0.009	0.001	0.02645
3450.00	2.8986	1.385	0.000	0.009	0.004	0.02659
3460.00	2.8902	1.387	0.000	0.009	0.003	0.02680
3470.00	2.8818	1.387	0.000	0.009	0.003	0.02683
3480.00	2.8736	1.390	0.000	0.009	0.002	0.02713
3490.00	2.8653	1.388	0.000	0.009	0.000	0.02686
3500.00	2.8571	1.387	0.000	0.009	0.000	0.02683
3510.00	2.8490	1.387	0.000	0.009	0.000	0.02680
3520.00	2.8409	1.388	0.000	0.009	0.001	0.02693
3530.00	2.8329	1.387	0.000	0.009	0.000	0.02679
3540.00	2.8249	1.387	0.000	0.009	0.001	0.02681
3550.00	2.8169	1.388	0.000	0.009	0.001	0.02691
3560.00	2.8090	1.388	0.000	0.009	0.000	0.02690
3570.00	2.8011	1.388	0.000	0.009	0.000	0.02684
3580.00	2.7933	1.386	0.000	0.009	0.000	0.02669
3590.00	2.7855	1.386	0.000	0.009	0.001	0.02665
3600.00	2.7778	1.387	0.000	0.009	0.002	0.02680
3610.00	2.7701	1.388	0.000	0.009	0.003	0.02694
3620.00	2.7624	1.390	0.000	0.009	0.001	0.02709
3630.00	2.7548	1.390	0.000	0.009	0.001	0.02710
3640.00	2.7473	1.390	0.000	0.009	0.000	0.02710
3650.00	2.7397	1.388	0.001	0.009	0.001	0.02693
3660.00	2.7322	1.388	0.000	0.009	0.000	0.02685
3670.00	2.7248	1.386	0.000	0.009	0.002	0.02689

Table 25. Dimethyl-methylphosphonate (DMMP). PAGE 8

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.390	0.000	0.009	0.002	0.02711
3690.00	2.7100	1.391	0.000	0.009	0.000	0.02720
3700.00	2.7027	1.389	0.000	0.009	0.000	0.02696
3710.00	2.6954	1.388	0.000	0.009	0.001	0.02687
3720.00	2.6882	1.390	0.000	0.009	0.002	0.02713
3730.00	2.6810	1.390	0.000	0.009	0.000	0.02714
3740.00	2.6738	1.390	0.000	0.009	0.000	0.02715
3750.00	2.6667	1.388	0.000	0.009	0.001	0.02694
3760.00	2.6596	1.390	0.000	0.009	0.002	0.02710
3770.00	2.6525	1.391	0.000	0.009	0.002	0.02721
3780.00	2.6455	1.393	0.000	0.009	0.001	0.02744
3790.00	2.6385	1.391	0.001	0.009	0.001	0.02729
3800.00	2.6316	1.391	0.001	0.009	0.001	0.02725
3810.00	2.6247	1.390	0.002	0.009	0.002	0.02710
3820.00	2.6178	1.389	0.002	0.009	0.002	0.02705
3830.00	2.6110	1.388	0.001	0.009	0.001	0.02689
3840.00	2.6042	1.389	0.000	0.009	0.001	0.02704
3850.00	2.5974	1.391	0.000	0.009	0.000	0.02722
3860.00	2.5907	1.390	0.001	0.009	0.001	0.02718
3870.00	2.5840	1.388	0.001	0.009	0.001	0.02686
3880.00	2.5773	1.387	0.000	0.009	0.001	0.02679
3890.00	2.5707	1.390	0.000	0.009	0.003	0.02710
3900.00	2.5641	1.391	0.000	0.009	0.001	0.02718
3910.00	2.5575	1.391	0.000	0.009	0.000	0.02722
3920.00	2.5510	1.390	0.000	0.009	0.001	0.02716
3930.00	2.5445	1.391	0.000	0.009	0.001	0.02725
3940.00	2.5381	1.391	0.000	0.009	0.000	0.02722
3950.00	2.5316	1.391	0.000	0.009	0.000	0.02720
3960.00	2.5253	1.390	0.000	0.009	0.001	0.02711
3970.00	2.5189	1.391	0.000	0.009	0.001	0.02722
3980.00	2.5126	1.390	0.001	0.009	0.001	0.02715
3990.00	2.5063	1.389	0.000	0.009	0.000	0.02701
4000.00	2.5000	1.388	0.000	0.009	0.001	0.02690

WN	WL	N	K	R
4000.80	2.4995	1.404	.0005350	0.02874
4016.87	2.4895	1.404	.0005740	0.02874
4033.07	2.4795	1.404	.0006320	0.02875
4049.40	2.4695	1.404	.0006870	0.02874
4065.87	2.4595	1.404	.0006670	0.02874
4082.47	2.4495	1.404	.0005290	0.02873
4099.20	2.4395	1.404	.0004210	0.02875
4116.07	2.4295	1.404	.0003650	0.02876
4133.09	2.4195	1.404	.0003560	0.02878
4150.24	2.4095	1.404	.0004220	0.02879
4167.53	2.3995	1.404	.0005380	0.02880
4184.98	2.3895	1.404	.0006370	0.02879
4202.56	2.3795	1.404	.0005580	0.02878
4220.30	2.3695	1.404	.0003780	0.02879
4238.19	2.3595	1.404	.0003490	0.02880
4256.22	2.3495	1.404	.0003500	0.02882
4274.42	2.3395	1.404	.0003300	0.02883
4292.77	2.3295	1.405	.0004260	0.02884
4311.27	2.3195	1.405	.0004740	0.02883
4329.94	2.3095	1.405	.0003150	0.02885
4348.77	2.2995	1.405	.0003070	0.02887
4367.77	2.2895	1.405	.0003710	0.02889
4386.93	2.2795	1.405	.0005950	0.02893
4406.26	2.2695	1.405	.0013400	0.02891
4425.76	2.2595	1.405	.0011680	0.02886
4445.43	2.2495	1.405	.0012150	0.02883
4465.28	2.2395	1.404	.0009060	0.02880
4485.31	2.2295	1.404	.0005780	0.02880
4505.52	2.2195	1.404	.0003520	0.02882
4525.91	2.2095	1.405	.0002310	0.02883
4546.49	2.1995	1.405	.0001620	0.02885
4567.25	2.1895	1.405	.0001210	0.02887
4588.21	2.1795	1.405	.0000970	0.02888
4609.36	2.1695	1.405	.0000820	0.02889
4630.70	2.1595	1.405	.0000690	0.02889
4652.24	2.1495	1.405	.0000550	0.02890
4673.99	2.1395	1.405	.0000490	0.02892
4695.94	2.1295	1.405	.0000460	0.02893
4718.09	2.1195	1.405	.0000390	0.02893
4740.46	2.1095	1.405	.0000330	0.02894
4763.04	2.0995	1.406	.0000300	0.02895
4785.83	2.0895	1.406	.0000290	0.02895
4808.85	2.0795	1.406	.0000260	0.02896
4832.08	2.0695	1.406	.0000210	0.02897
4855.55	2.0595	1.406	.0000170	0.02898
4879.24	2.0495	1.406	.0000160	0.02899
4903.16	2.0395	1.406	.0000150	0.02899
4927.32	2.0295	1.406	.0000140	0.02900
4951.72	2.0195	1.406	.0000130	0.02901
4976.36	2.0095	1.406	.0000120	0.02901

Table 25. Dimethyl-methylphosphonate (DMMP).

PAGE 10

WN	WL	N	K	R
5001.25	1.9995	1.406	.0000120	0.02902
5026.39	1.9895	1.406	.0000120	0.02903
5051.78	1.9795	1.406	.0000120	0.02903
5077.43	1.9695	1.406	.0000130	0.02904
5103.34	1.9595	1.406	.0000140	0.02904
5129.52	1.9495	1.406	.0000150	0.02905
5155.97	1.9395	1.407	.0000150	0.02906
5182.69	1.9295	1.407	.0000170	0.02907
5209.69	1.9195	1.407	.0000190	0.02907
5236.97	1.9095	1.407	.0000160	0.02908
5264.54	1.8995	1.407	.0000160	0.02908
5292.41	1.8895	1.407	.0000190	0.02909
5320.56	1.8795	1.407	.0000180	0.02909
5349.02	1.8695	1.407	.0000180	0.02910
5377.79	1.8595	1.407	.0000180	0.02911
5406.87	1.8495	1.407	.0000160	0.02911
5436.26	1.8395	1.407	.0000160	0.02911
5465.97	1.8295	1.407	.0000160	0.02913
5496.02	1.8195	1.407	.0000180	0.02913
5526.39	1.8095	1.407	.0000210	0.02914
5557.10	1.7995	1.407	.0000230	0.02914
5588.15	1.7895	1.407	.0000260	0.02915
5619.56	1.7795	1.407	.0000290	0.02915
5651.31	1.7695	1.407	.0000260	0.02915
5683.43	1.7595	1.407	.0000250	0.02917
5715.92	1.7495	1.408	.0000410	0.02917
5748.78	1.7395	1.408	.0000470	0.02918
5782.02	1.7295	1.408	.0000930	0.02918
5815.64	1.7195	1.408	.0000920	0.02918
5849.66	1.7095	1.408	.0000720	0.02919
5884.08	1.6995	1.408	.0000560	0.02919
5918.91	1.6895	1.408	.0000720	0.02920
5954.15	1.6795	1.408	.0000940	0.02920
5989.82	1.6695	1.408	.0000790	0.02920
6025.91	1.6595	1.408	.0000420	0.02921
6062.44	1.6495	1.408	.0000210	0.02921
6099.42	1.6395	1.408	.0000150	0.02922
6136.85	1.6295	1.408	.0000110	0.02923
6174.75	1.6195	1.408	.0000080	0.02923
6213.11	1.6095	1.408	.0000060	0.02923
6351.22	1.5745	1.408	.0000030	0.02926
6391.82	1.5645	1.408	.0000020	0.02926
6432.94	1.5545	1.408	.0000020	0.02927
6474.59	1.5445	1.408	.0000020	0.02927
6516.78	1.5345	1.408	.0000020	0.02927
6559.53	1.5245	1.408	.0000020	0.02928
6602.84	1.5145	1.408	.0000030	0.02929
6646.73	1.5045	1.408	.0000030	0.02929
6691.20	1.4945	1.409	.0000040	0.02930
6736.27	1.4845	1.409	.0000040	0.02930



Table 25. Dimethyl-methylphosphonate (DMMP).

PAGE 11

WN	WL	N	K	R
6781.96	1.4745	1.409	.0000030	0.02931
6828.27	1.4645	1.409	.0000040	0.02931
6875.21	1.4545	1.409	.0000050	0.02931
6922.81	1.4445	1.409	.0000070	0.02932
6971.07	1.4345	1.409	.0000080	0.02933
7020.01	1.4245	1.409	.0000070	0.02933
7069.64	1.4145	1.409	.0000070	0.02934
7119.97	1.4045	1.409	.0000070	0.02934
7171.03	1.3945	1.409	.0000120	0.02935
7222.82	1.3845	1.409	.0000160	0.02935
7275.37	1.3745	1.409	.0000110	0.02936
7328.69	1.3645	1.409	.0000120	0.02936
7382.80	1.3545	1.409	.0000110	0.02936
7437.71	1.3445	1.409	.0000080	0.02937
7493.44	1.3345	1.409	.0000040	0.02938
7550.02	1.3245	1.409	.0000020	0.02938
7607.46	1.3145	1.409	.0000010	0.02939
7665.77	1.3045	1.409	.0000010	0.02939
7724.99	1.2945	1.409	.0000010	0.02940
7785.13	1.2845	1.409	.0000010	0.02941
7846.21	1.2745	1.409	.0000010	0.02941
7908.26	1.2645	1.410	.0000010	0.02941
7971.30	1.2545	1.410	.0000010	0.02942
8035.36	1.2445	1.410	.0000010	0.02943
8100.45	1.2345	1.410	.0000010	0.02943
8166.60	1.2245	1.410	.0000010	0.02943
8233.84	1.2145	1.410	.0000010	0.02943
8302.20	1.2045	1.410	.0000020	0.02944
8371.70	1.1945	1.410	.0000030	0.02945
8442.38	1.1845	1.410	.0000060	0.02945
8514.26	1.1745	1.410	.0000100	0.02946
8587.38	1.1645	1.410	.0000090	0.02946
8661.76	1.1545	1.410	.0000060	0.02946
8737.44	1.1445	1.410	.0000050	0.02947
8814.46	1.1345	1.410	.0000040	0.02948
8892.84	1.1245	1.410	.0000020	0.02948
8972.63	1.1145	1.410	.0000010	0.02948
9053.87	1.1045	1.410	.0000010	0.02949
9136.59	1.0945	1.410	.0000010	0.02950
9220.84	1.0845	1.410	.0000010	0.02950
9306.65	1.0745	1.410	.0000000	0.02951
9394.08	1.0645	1.410	.0000010	0.02952
9483.17	1.0545	1.410	.0000000	0.02952
9573.96	1.0445	1.410	.0000010	0.02952
9666.51	1.0345	1.410	.0000010	0.02953
9760.86	1.0245	1.411	.0000010	0.02953
9857.07	1.0145	1.411	.0000010	0.02954
9955.20	1.0045	1.411	.0000010	0.02955
10055.30	0.9945	1.411	.0000010	0.02955
10157.40	0.9845	1.411	.0000000	0.02956

WN	WL	N	K	R
10261.70	0.9745	1.411	.0000000	0.02956
10368.10	0.9645	1.411	.0000000	0.02957
10476.70	0.9545	1.411	.0000000	0.02957
10587.60	0.9445	1.411	.0000000	0.02958
10700.90	0.9345	1.411	.0000000	0.02958
10816.70	0.9245	1.411	.0000000	0.02959
10934.90	0.9145	1.411	.0000000	0.02960
11055.80	0.9045	1.411	.0000010	0.02960
11179.40	0.8945	1.411	.0000010	0.02961
11305.80	0.8845	1.411	.0000010	0.02961
11435.10	0.8745	1.411	.0000000	0.02962
11567.40	0.8645	1.411	.0000000	0.02962
11702.80	0.8545	1.411	.0000000	0.02963
11841.30	0.8445	1.411	.0000000	0.02964
11983.20	0.8345	1.411	.0000000	0.02964
12128.60	0.8245	1.411	.0000000	0.02965
12277.50	0.8145	1.412	.0000000	0.02965
12430.10	0.8045	1.412	.0000000	0.02966

#### 4.22 Diisopropyl Methyl Phosphonate (DIMP).

DIMP  $[(C_3H_7O)_2P(O)(CH_3)]$  of 98% or better purity was obtained from the Columbia Organic Chemical Co.

Acquisition of reflectance spectra in the  $180-4000\text{ cm}^{-1}$  wave-number region, transmittance spectra in the  $800-2500\text{ nm}$  wavelength region, and analysis of those spectra to determine  $n$  and  $k$  was similar to that described in Section 4.20. The resultant values are presented in Figures 46 and 47 and in Table 26.

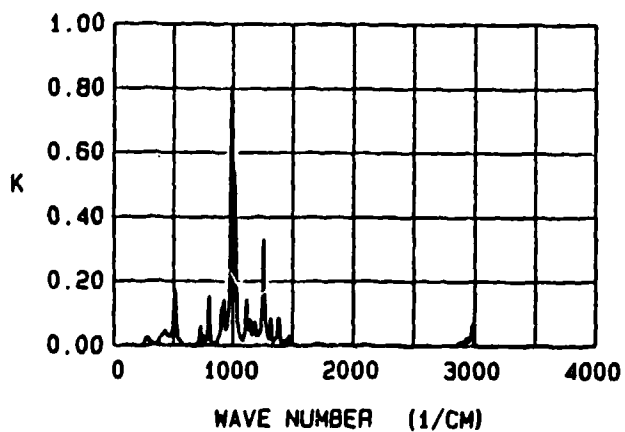
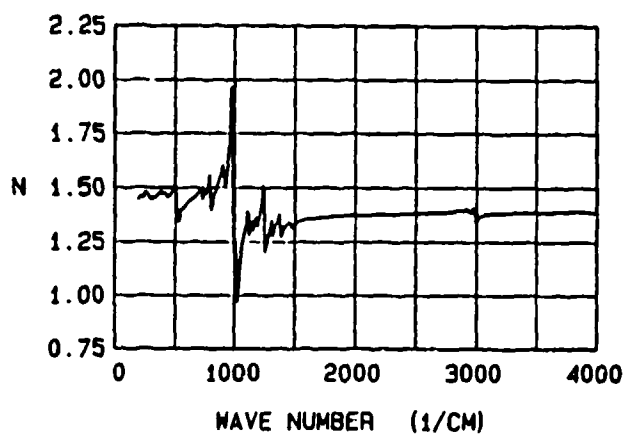
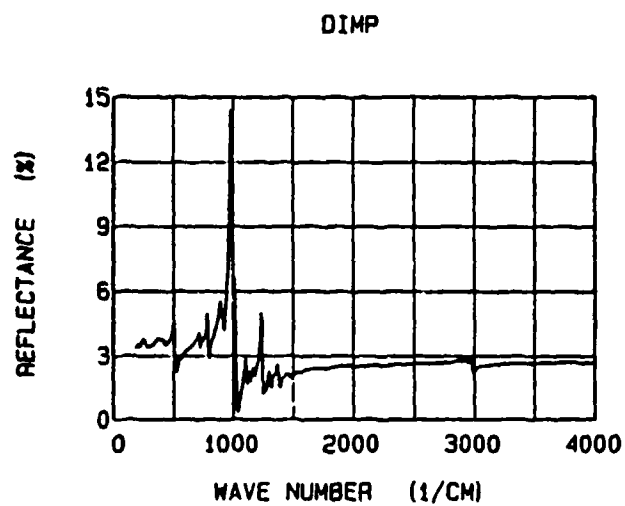


Figure 46. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index  $N$ , and extinction coefficient  $K$  spectra of DIMP. The  $N$  and  $K$  spectra are from Kramers-Kronig analysis of the reflectance spectrum.

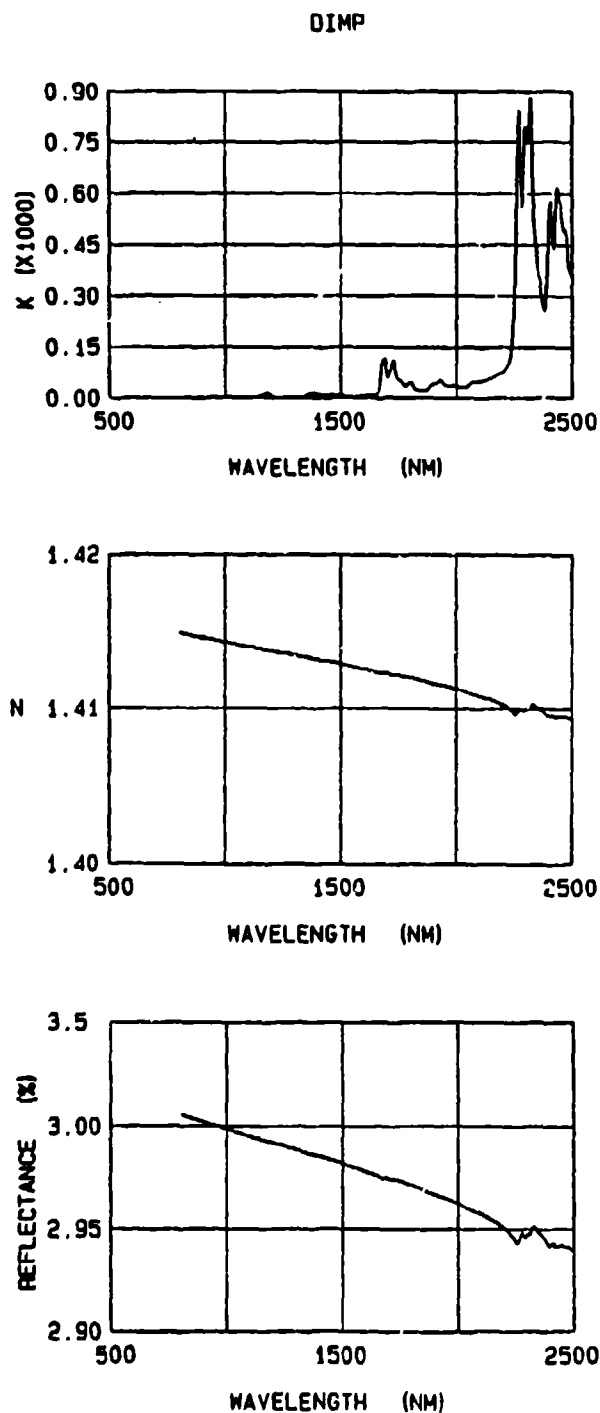


Figure 47. The extinction coefficient  $K$  and refractive index  $N$  spectra of DIMP in the 800-2,500 nm region. The  $K$  spectrum was determined from transmittance measurements. The  $N$  spectrum is from Kramers-Kronig analysis of the  $K$  spectrum. Reflectance was computed from  $N$  and  $K$ .

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	1.441	0.000	0.013	0.007	0.03325
190.00	52.6316	1.448	0.000	0.008	0.009	0.03405
200.00	50.0000	1.453	0.000	0.008	0.010	0.03470
210.00	47.6190	1.458	0.000	0.008	0.002	0.03530
220.00	45.4545	1.449	0.000	0.008	0.007	0.03425
230.00	43.4783	1.463	0.000	0.008	0.012	0.03595
240.00	41.6667	1.472	0.000	0.008	0.003	0.03715
250.00	40.0000	1.477	0.011	0.008	0.011	0.03775
260.00	38.4615	1.469	0.024	0.009	0.012	0.03675
270.00	37.0370	1.458	0.026	0.009	0.012	0.03545
280.00	35.7143	1.449	0.024	0.009	0.012	0.03425
290.00	34.4828	1.444	0.016	0.009	0.011	0.03365
300.00	33.3333	1.449	0.008	0.008	0.008	0.03420
310.00	32.2581	1.450	0.008	0.008	0.008	0.03430
320.00	31.2500	1.451	0.006	0.008	0.006	0.03445
330.00	30.3030	1.454	0.005	0.008	0.005	0.03480
340.00	29.4118	1.458	0.001	0.008	0.001	0.03535
350.00	28.5714	1.467	0.005	0.008	0.005	0.03645
360.00	27.7778	1.472	0.005	0.008	0.005	0.03710
370.00	27.0270	1.480	0.015	0.008	0.012	0.03820
380.00	26.3158	1.475	0.024	0.009	0.012	0.03755
390.00	25.6410	1.474	0.028	0.009	0.012	0.03750
400.00	25.0000	1.471	0.031	0.009	0.012	0.03715
410.00	24.3902	1.474	0.039	0.009	0.013	0.03760
420.00	23.8095	1.468	0.045	0.009	0.012	0.03695
430.00	23.2558	1.452	0.043	0.009	0.012	0.03490
440.00	22.7273	1.453	0.033	0.009	0.012	0.03485
450.00	22.2222	1.460	0.028	0.009	0.012	0.03570
460.00	21.7391	1.466	0.026	0.009	0.012	0.03640
470.00	21.2766	1.477	0.028	0.009	0.012	0.03785
480.00	20.8333	1.492	0.044	0.009	0.013	0.03995
490.00	20.4082	1.504	0.064	0.010	0.014	0.04180
500.00	20.0000	1.508	0.147	0.012	0.015	0.04505
510.00	19.6078	1.391	0.147	0.012	0.013	0.03095
520.00	19.2308	1.349	0.100	0.011	0.011	0.02425
530.00	18.8679	1.358	0.032	0.010	0.009	0.02370
540.00	18.5185	1.388	0.018	0.009	0.010	0.02690
550.00	18.1818	1.400	0.018	0.009	0.010	0.02840
560.00	17.8571	1.402	0.014	0.009	0.010	0.02855
570.00	17.5439	1.409	0.004	0.009	0.004	0.02935
580.00	17.2414	1.412	0.004	0.009	0.004	0.02970
590.00	16.9492	1.421	0.000	0.008	0.001	0.03080
600.00	16.6667	1.426	0.000	0.008	0.001	0.03145
610.00	16.3934	1.435	0.001	0.008	0.001	0.03245
620.00	16.1290	1.438	0.000	0.008	0.001	0.03280
630.00	15.8730	1.440	0.000	0.008	0.002	0.03305
640.00	15.6250	1.446	0.002	0.008	0.002	0.03380
650.00	15.3846	1.451	0.003	0.008	0.003	0.03450
660.00	15.1515	1.454	0.000	0.008	0.004	0.03490
670.00	14.9254	1.456	0.000	0.008	0.001	0.03510

WN	WL	N	K	DN	DK	R
680.00	14.7059	1.469	0.002	0.008	0.002	0.03675
690.00	14.4928	1.473	0.002	0.008	0.002	0.03725
700.00	14.2857	1.483	0.009	0.008	0.009	0.03850
710.00	14.0845	1.498	0.022	0.008	0.013	0.04050
720.00	13.8889	1.459	0.060	0.010	0.013	0.03600
730.00	13.6986	1.454	0.013	0.009	0.011	0.03485
740.00	13.5135	1.477	0.015	0.008	0.012	0.03780
750.00	13.3333	1.477	0.032	0.009	0.012	0.03790
760.00	13.1579	1.476	0.014	0.008	0.012	0.03760
770.00	12.9870	1.496	0.015	0.008	0.013	0.04025
780.00	12.8205	1.540	0.034	0.009	0.014	0.04610
790.00	12.6582	1.497	0.150	0.012	0.015	0.04380
800.00	12.5000	1.396	0.068	0.010	0.011	0.02865
810.00	12.3457	1.432	0.016	0.009	0.011	0.03215
820.00	12.1951	1.460	0.009	0.008	0.009	0.03560
830.00	12.0482	1.474	0.007	0.008	0.007	0.03735
840.00	11.9048	1.487	0.004	0.008	0.004	0.03905
850.00	11.7647	1.504	0.009	0.008	0.009	0.04125
860.00	11.6279	1.521	0.009	0.008	0.009	0.04350
870.00	11.4943	1.540	0.017	0.008	0.014	0.04605
880.00	11.3636	1.555	0.029	0.008	0.015	0.04815
890.00	11.2360	1.591	0.051	0.009	0.016	0.05325
900.00	11.1111	1.556	0.119	0.011	0.016	0.05015
910.00	10.9890	1.572	0.100	0.010	0.016	0.05175
920.00	10.8696	1.500	0.124	0.011	0.015	0.04315
930.00	10.7527	1.535	0.052	0.009	0.014	0.04575
940.00	10.6383	1.594	0.050	0.009	0.016	0.05360
950.00	10.5263	1.662	0.063	0.009	0.019	0.06340
960.00	10.4167	1.754	0.104	0.010	0.022	0.07745
970.00	10.3093	1.932	0.267	0.017	0.029	0.10980
980.00	10.2041	1.802	0.742	0.030	0.022	0.14375
990.00	10.1010	1.325	0.721	0.020	0.007	0.10710
1000.00	10.0000	1.233	0.489	0.013	0.008	0.05720
1010.00	9.9010	1.196	0.542	0.014	0.006	0.06605
1020.00	9.8039	0.971	0.380	0.009	0.007	0.03690
1030.00	9.7087	1.019	0.144	0.004	0.014	0.00530
1040.00	9.6154	1.117	0.064	0.017	0.011	0.00405
1050.00	9.5238	1.188	0.039	0.014	0.007	0.00785
1060.00	9.4340	1.232	0.025	0.012	0.007	0.01115
1070.00	9.3458	1.268	0.019	0.011	0.007	0.01435
1080.00	9.2593	1.296	0.019	0.011	0.008	0.01700
1090.00	9.1743	1.337	0.024	0.010	0.009	0.02130
1100.00	9.0909	1.386	0.057	0.010	0.011	0.02720
1110.00	9.0090	1.334	0.143	0.012	0.012	0.02455
1120.00	8.9286	1.286	0.061	0.011	0.009	0.01670
1130.00	8.8496	1.321	0.045	0.011	0.009	0.01985
1140.00	8.7719	1.340	0.083	0.011	0.010	0.02280
1150.00	8.6957	1.305	0.041	0.011	0.009	0.01815
1160.00	8.6207	1.342	0.036	0.010	0.009	0.02200
1170.00	8.5470	1.357	0.046	0.010	0.010	0.02380

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 3

WN	WL	N	K	DN	DK	R
1180.00	8.4746	1.334	0.074	0.011	0.010	0.02190
1190.00	8.4034	1.336	0.033	0.010	0.009	0.02130
1200.00	8.3333	1.362	0.028	0.010	0.009	0.02405
1210.00	8.2645	1.386	0.033	0.010	0.010	0.02685
1220.00	8.1967	1.411	0.035	0.009	0.011	0.02975
1230.00	8.1301	1.465	0.069	0.010	0.013	0.03700
1240.00	8.0645	1.500	0.245	0.013	0.016	0.04990
1250.00	8.0000	1.225	0.266	0.011	0.011	0.02465
1260.00	7.9365	1.215	0.117	0.012	0.010	0.01245
1270.00	7.8740	1.234	0.063	0.013	0.008	0.01200
1280.00	7.8125	1.267	0.034	0.012	0.008	0.01435
1290.00	7.7519	1.296	0.021	0.011	0.008	0.01700
1300.00	7.6923	1.325	0.022	0.010	0.008	0.02005
1310.00	7.6336	1.329	0.086	0.011	0.010	0.02170
1320.00	7.5758	1.273	0.032	0.011	0.008	0.01490
1330.00	7.5188	1.307	0.009	0.010	0.007	0.01810
1340.00	7.4627	1.326	0.015	0.010	0.008	0.02005
1350.00	7.4074	1.336	0.022	0.010	0.009	0.02120
1360.00	7.3529	1.347	0.021	0.010	0.009	0.02235
1370.00	7.2993	1.376	0.055	0.010	0.010	0.02600
1380.00	7.2464	1.327	0.070	0.011	0.010	0.02100
1390.00	7.1942	1.272	0.055	0.012	0.009	0.01520
1400.00	7.1429	1.297	0.013	0.010	0.007	0.01705
1410.00	7.0922	1.317	0.010	0.010	0.008	0.01915
1420.00	7.0423	1.319	0.015	0.010	0.008	0.01935
1430.00	6.9930	1.324	0.012	0.010	0.008	0.01985
1440.00	6.9444	1.335	0.012	0.010	0.008	0.02100
1450.00	6.8966	1.341	0.019	0.010	0.009	0.02175
1460.00	6.8493	1.337	0.023	0.010	0.009	0.02125
1470.00	6.8027	1.321	0.026	0.010	0.008	0.01965
1480.00	6.7568	1.323	0.004	0.010	0.004	0.01975
1490.00	6.7114	1.329	0.005	0.010	0.005	0.02040
1500.00	6.6667	1.329	0.005	0.010	0.005	0.02040
1510.00	6.6225	1.333	0.001	0.010	0.001	0.02080
1520.00	6.5789	1.343	0.002	0.009	0.002	0.02185
1530.00	6.5359	1.343	0.002	0.009	0.002	0.02185
1540.00	6.4935	1.343	0.002	0.009	0.002	0.02185
1550.00	6.4516	1.344	0.002	0.009	0.002	0.02195
1560.00	6.4103	1.346	0.000	0.009	0.000	0.02220
1570.00	6.3694	1.349	0.000	0.009	0.000	0.02245
1580.00	6.3291	1.350	0.000	0.009	0.000	0.02265
1590.00	6.2893	1.352	0.001	0.009	0.001	0.02285
1600.00	6.2500	1.353	0.001	0.009	0.001	0.02295
1610.00	6.2112	1.354	0.001	0.009	0.001	0.02305
1620.00	6.1728	1.355	0.001	0.009	0.001	0.02315
1630.00	6.1350	1.356	0.000	0.009	0.000	0.02330
1640.00	6.0976	1.358	0.001	0.009	0.001	0.02350
1650.00	6.0606	1.359	0.002	0.009	0.002	0.02365
1660.00	6.0241	1.360	0.003	0.009	0.003	0.02370
1670.00	5.9880	1.359	0.003	0.009	0.003	0.02365



Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 4

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.360	0.002	0.009	0.002	0.02370
1690.00	5.9172	1.362	0.003	0.009	0.003	0.02390
1700.00	5.8824	1.362	0.004	0.009	0.004	0.02390
1710.00	5.8480	1.361	0.005	0.009	0.005	0.02385
1720.00	5.8140	1.360	0.004	0.009	0.004	0.02370
1730.00	5.7803	1.360	0.003	0.009	0.003	0.02370
1740.00	5.7471	1.362	0.001	0.009	0.001	0.02390
1750.00	5.7143	1.363	0.002	0.009	0.002	0.02410
1760.00	5.6818	1.363	0.004	0.009	0.004	0.02410
1770.00	5.6497	1.361	0.004	0.009	0.004	0.02385
1780.00	5.6180	1.361	0.001	0.009	0.001	0.02385
1790.00	5.5866	1.363	0.000	0.009	0.001	0.02405
1800.00	5.5556	1.366	0.000	0.009	0.001	0.02435
1810.00	5.5249	1.366	0.001	0.009	0.001	0.02440
1820.00	5.4945	1.366	0.001	0.009	0.001	0.02440
1830.00	5.4645	1.367	0.001	0.009	0.001	0.02445
1840.00	5.4348	1.367	0.000	0.009	0.000	0.02455
1850.00	5.4054	1.368	0.001	0.009	0.001	0.02465
1860.00	5.3763	1.368	0.001	0.009	0.001	0.02465
1870.00	5.3476	1.369	0.001	0.009	0.001	0.02470
1880.00	5.3191	1.369	0.001	0.009	0.001	0.02475
1890.00	5.2910	1.370	0.001	0.009	0.001	0.02485
1900.00	5.2632	1.370	0.002	0.009	0.002	0.02480
1910.00	5.2356	1.370	0.001	0.009	0.001	0.02480
1920.00	5.2083	1.371	0.001	0.009	0.001	0.02490
1930.00	5.1813	1.371	0.001	0.009	0.001	0.02500
1940.00	5.1546	1.373	0.002	0.009	0.002	0.02515
1950.00	5.1282	1.373	0.003	0.009	0.003	0.02515
1960.00	5.1020	1.372	0.003	0.009	0.003	0.02505
1970.00	5.0761	1.372	0.002	0.009	0.002	0.02505
1980.00	5.0505	1.373	0.003	0.009	0.003	0.02520
1990.00	5.0251	1.373	0.004	0.009	0.004	0.02515
2000.00	5.0000	1.371	0.005	0.009	0.005	0.02495
2010.00	4.9751	1.370	0.003	0.009	0.003	0.02485
2020.00	4.9505	1.371	0.002	0.009	0.002	0.02495
2030.00	4.9261	1.371	0.001	0.009	0.001	0.02495
2040.00	4.9020	1.373	0.001	0.009	0.001	0.02515
2050.00	4.8780	1.373	0.001	0.009	0.001	0.02520
2060.00	4.8544	1.374	0.003	0.009	0.003	0.02525
2070.00	4.8309	1.373	0.003	0.009	0.003	0.02520
2080.00	4.8077	1.373	0.003	0.009	0.003	0.02515
2090.00	4.7847	1.372	0.002	0.009	0.002	0.02510
2100.00	4.7619	1.373	0.003	0.009	0.003	0.02520
2110.00	4.7393	1.372	0.003	0.009	0.003	0.02510
2120.00	4.7170	1.371	0.002	0.009	0.002	0.02500
2130.00	4.6948	1.372	0.000	0.009	0.000	0.02505
2140.00	4.6729	1.373	0.000	0.009	0.000	0.02520
2150.00	4.6512	1.373	0.000	0.009	0.000	0.02520
2160.00	4.6296	1.374	0.000	0.009	0.000	0.02530
2170.00	4.6083	1.374	0.000	0.009	0.000	0.02530

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 5

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.375	0.000	0.009	0.000	0.02540
2190.00	4.5662	1.375	0.000	0.009	0.000	0.02535
2200.00	4.5455	1.375	0.000	0.009	0.001	0.02545
2210.00	4.5249	1.377	0.001	0.009	0.001	0.02565
2220.00	4.5045	1.376	0.002	0.009	0.002	0.02555
2230.00	4.4843	1.375	0.002	0.009	0.002	0.02535
2240.00	4.4643	1.375	0.000	0.009	0.001	0.02535
2250.00	4.4444	1.377	0.000	0.009	0.001	0.02565
2260.00	4.4248	1.378	0.001	0.009	0.001	0.02570
2270.00	4.4053	1.376	0.002	0.009	0.002	0.02555
2280.00	4.3860	1.375	0.000	0.009	0.000	0.02545
2290.00	4.3668	1.377	0.000	0.009	0.000	0.02560
2300.00	4.3478	1.377	0.001	0.009	0.001	0.02565
2310.00	4.3290	1.376	0.001	0.009	0.001	0.02550
2320.00	4.3103	1.375	0.000	0.009	0.000	0.02535
2330.00	4.2918	1.376	0.000	0.009	0.002	0.02550
2340.00	4.2735	1.377	0.000	0.009	0.003	0.02560
2350.00	4.2553	1.379	0.000	0.009	0.001	0.02590
2360.00	4.2373	1.378	0.000	0.009	0.000	0.02580
2370.00	4.2194	1.379	0.000	0.009	0.001	0.02585
2380.00	4.2017	1.379	0.000	0.009	0.001	0.02585
2390.00	4.1841	1.380	0.000	0.009	0.000	0.02595
2400.00	4.1667	1.377	0.001	0.009	0.001	0.02565
2410.00	4.1494	1.377	0.000	0.009	0.001	0.02565
2420.00	4.1322	1.378	0.000	0.009	0.002	0.02575
2430.00	4.1152	1.379	0.000	0.009	0.001	0.02590
2440.00	4.0984	1.378	0.000	0.009	0.000	0.02580
2450.00	4.0816	1.378	0.000	0.009	0.003	0.02575
2460.00	4.0650	1.379	0.000	0.009	0.003	0.02590
2470.00	4.0486	1.381	0.000	0.009	0.003	0.02610
2480.00	4.0323	1.382	0.000	0.009	0.003	0.02625
2490.00	4.0161	1.382	0.000	0.009	0.002	0.02620
2500.00	4.0000	1.383	0.000	0.009	0.002	0.02630
2510.00	3.9841	1.383	0.000	0.009	0.000	0.02635
2520.00	3.9683	1.382	0.000	0.009	0.000	0.02620
2530.00	3.9526	1.382	0.000	0.009	0.000	0.02620
2540.00	3.9370	1.383	0.000	0.009	0.001	0.02630
2550.00	3.9216	1.383	0.000	0.009	0.001	0.02635
2560.00	3.9063	1.383	0.000	0.009	0.000	0.02635
2570.00	3.8911	1.384	0.000	0.009	0.000	0.02640
2580.00	3.8760	1.383	0.001	0.009	0.001	0.02635
2590.00	3.8610	1.383	0.000	0.009	0.000	0.02630
2600.00	3.8462	1.384	0.000	0.009	0.000	0.02645
2610.00	3.8314	1.384	0.001	0.009	0.001	0.02645
2620.00	3.8168	1.383	0.003	0.009	0.003	0.02630
2630.00	3.8023	1.380	0.001	0.009	0.001	0.02595
2640.00	3.7879	1.381	0.000	0.009	0.003	0.02610
2650.00	3.7736	1.385	0.000	0.009	0.004	0.02650
2660.00	3.7594	1.387	0.000	0.009	0.002	0.02680
2670.00	3.7453	1.387	0.001	0.009	0.001	0.02675

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 6

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.385	0.001	0.009	0.001	0.02655
2690.00	3.7175	1.386	0.000	0.009	0.000	0.02670
2700.00	3.7037	1.385	0.001	0.009	0.001	0.02655
2710.00	3.6900	1.385	0.001	0.009	0.001	0.02660
2720.00	3.6765	1.385	0.001	0.009	0.001	0.02650
2730.00	3.6630	1.385	0.000	0.009	0.000	0.02660
2740.00	3.6496	1.385	0.000	0.009	0.000	0.02660
2750.00	3.6364	1.386	0.000	0.009	0.001	0.02670
2760.00	3.6232	1.388	0.000	0.009	0.001	0.02690
2770.00	3.6101	1.389	0.001	0.009	0.001	0.02705
2780.00	3.5971	1.389	0.002	0.009	0.002	0.02700
2790.00	3.5842	1.388	0.003	0.009	0.003	0.02690
2800.00	3.5714	1.387	0.001	0.009	0.001	0.02680
2810.00	3.5587	1.389	0.000	0.009	0.000	0.02705
2820.00	3.5461	1.390	0.001	0.009	0.001	0.02715
2830.00	3.5336	1.391	0.002	0.009	0.002	0.02730
2840.00	3.5211	1.391	0.003	0.009	0.003	0.02725
2850.00	3.5088	1.393	0.003	0.009	0.003	0.02745
2860.00	3.4965	1.395	0.005	0.009	0.005	0.02775
2870.00	3.4843	1.395	0.006	0.009	0.006	0.02770
2880.00	3.4722	1.391	0.014	0.009	0.010	0.02725
2890.00	3.4602	1.391	0.006	0.009	0.006	0.02725
2900.00	3.4483	1.399	0.005	0.009	0.005	0.02820
2910.00	3.4364	1.396	0.011	0.009	0.010	0.02780
2920.00	3.4247	1.403	0.017	0.009	0.010	0.02875
2930.00	3.4130	1.397	0.027	0.009	0.010	0.02805
2940.00	3.4014	1.383	0.024	0.009	0.010	0.02645
2950.00	3.3898	1.386	0.017	0.009	0.010	0.02675
2960.00	3.3784	1.397	0.019	0.009	0.010	0.02805
2970.00	3.3670	1.406	0.043	0.010	0.011	0.02935
2980.00	3.3557	1.362	0.067	0.011	0.010	0.02470
2990.00	3.3445	1.337	0.031	0.010	0.009	0.02140
3000.00	3.3333	1.346	0.007	0.009	0.007	0.02220
3010.00	3.3223	1.352	0.001	0.009	0.001	0.02280
3020.00	3.3113	1.361	0.000	0.009	0.000	0.02335
3030.00	3.3003	1.367	0.000	0.009	0.002	0.02455
3040.00	3.2895	1.369	0.000	0.009	0.001	0.02475
3050.00	3.2787	1.371	0.000	0.009	0.002	0.02500
3060.00	3.2680	1.372	0.000	0.009	0.000	0.02510
3070.00	3.2573	1.372	0.000	0.009	0.000	0.02510
3080.00	3.2468	1.372	0.000	0.009	0.001	0.02505
3090.00	3.2362	1.374	0.000	0.009	0.002	0.02525
3100.00	3.2258	1.374	0.000	0.009	0.003	0.02530
3110.00	3.2154	1.375	0.000	0.009	0.004	0.02545
3120.00	3.2051	1.377	0.000	0.009	0.004	0.02565
3130.00	3.1949	1.378	0.000	0.009	0.003	0.02575
3140.00	3.1847	1.378	0.000	0.009	0.001	0.02580
3150.00	3.1746	1.377	0.000	0.009	0.002	0.02565
3160.00	3.1646	1.378	0.000	0.009	0.003	0.02570
3170.00	3.1546	1.379	0.000	0.009	0.004	0.02590

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 7

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.381	0.000	0.009	0.003	0.02610
3190.00	3.1348	1.381	0.000	0.009	0.000	0.02610
3200.00	3.1250	1.380	0.001	0.009	0.001	0.02595
3210.00	3.1153	1.377	0.000	0.009	0.002	0.02560
3220.00	3.1056	1.378	0.000	0.009	0.004	0.02580
3230.00	3.0960	1.380	0.000	0.009	0.004	0.02600
3240.00	3.0864	1.382	0.000	0.009	0.003	0.02615
3250.00	3.0769	1.381	0.000	0.009	0.002	0.02610
3260.00	3.0675	1.381	0.000	0.009	0.002	0.02610
3270.00	3.0581	1.380	0.000	0.009	0.003	0.02600
3280.00	3.0488	1.381	0.000	0.009	0.004	0.02605
3290.00	3.0395	1.383	0.000	0.009	0.005	0.02630
3300.00	3.0303	1.384	0.000	0.009	0.003	0.02645
3310.00	3.0211	1.384	0.000	0.009	0.003	0.02645
3320.00	3.0120	1.385	0.000	0.009	0.002	0.02650
3330.00	3.0030	1.385	0.000	0.009	0.001	0.02655
3340.00	2.9940	1.383	0.000	0.009	0.000	0.02635
3350.00	2.9851	1.381	0.000	0.009	0.001	0.02610
3360.00	2.9762	1.382	0.000	0.009	0.002	0.02625
3370.00	2.9674	1.383	0.000	0.009	0.002	0.02635
3380.00	2.9586	1.383	0.000	0.009	0.002	0.02630
3390.00	2.9499	1.383	0.000	0.009	0.003	0.02635
3400.00	2.9412	1.385	0.000	0.009	0.004	0.02660
3410.00	2.9326	1.386	0.000	0.009	0.002	0.02665
3420.00	2.9240	1.385	0.000	0.009	0.000	0.02655
3430.00	2.9155	1.384	0.001	0.009	0.001	0.02640
3440.00	2.9070	1.383	0.000	0.009	0.001	0.02630
3450.00	2.8986	1.382	0.000	0.009	0.000	0.02620
3460.00	2.8902	1.382	0.000	0.009	0.002	0.02625
3470.00	2.8818	1.383	0.000	0.009	0.004	0.02630
3480.00	2.8736	1.384	0.000	0.009	0.004	0.02645
3490.00	2.8653	1.387	0.000	0.009	0.002	0.02675
3500.00	2.8571	1.386	0.000	0.009	0.002	0.02665
3510.00	2.8490	1.385	0.000	0.009	0.001	0.02660
3520.00	2.8409	1.385	0.000	0.009	0.000	0.02650
3530.00	2.8329	1.385	0.000	0.009	0.001	0.02650
3540.00	2.8249	1.384	0.000	0.009	0.001	0.02640
3550.00	2.8169	1.384	0.000	0.009	0.003	0.02645
3560.00	2.8090	1.385	0.000	0.009	0.002	0.02660
3570.00	2.8011	1.386	0.000	0.009	0.002	0.02665
3580.00	2.7933	1.386	0.000	0.009	0.000	0.02665
3590.00	2.7855	1.384	0.000	0.009	0.001	0.02645
3600.00	2.7778	1.385	0.000	0.009	0.001	0.02650
3610.00	2.7701	1.383	0.000	0.009	0.002	0.02635
3620.00	2.7624	1.385	0.000	0.009	0.002	0.02655
3630.00	2.7548	1.385	0.000	0.009	0.002	0.02655
3640.00	2.7473	1.385	0.000	0.009	0.001	0.02650
3650.00	2.7397	1.382	0.000	0.009	0.003	0.02625
3660.00	2.7322	1.385	0.000	0.009	0.005	0.02655
3670.00	2.7248	1.387	0.000	0.009	0.004	0.02675

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 8

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.387	0.000	0.009	0.003	0.02675
3690.00	2.7100	1.386	0.000	0.009	0.003	0.02670
3700.00	2.7027	1.386	0.000	0.009	0.003	0.02670
3710.00	2.6954	1.387	0.000	0.009	0.004	0.02675
3720.00	2.6882	1.388	0.000	0.009	0.003	0.02690
3730.00	2.6810	1.387	0.000	0.009	0.002	0.02680
3740.00	2.6738	1.387	0.000	0.009	0.002	0.02680
3750.00	2.6667	1.386	0.000	0.009	0.003	0.02670
3760.00	2.6596	1.388	0.000	0.009	0.003	0.02690
3770.00	2.6525	1.389	0.000	0.009	0.002	0.02700
3780.00	2.6455	1.388	0.000	0.009	0.001	0.02685
3790.00	2.6385	1.386	0.000	0.009	0.001	0.02670
3800.00	2.6316	1.386	0.000	0.009	0.002	0.02665
3810.00	2.6247	1.387	0.000	0.009	0.004	0.02680
3820.00	2.6178	1.388	0.000	0.009	0.002	0.02685
3830.00	2.6110	1.388	0.000	0.009	0.003	0.02690
3840.00	2.6042	1.389	0.000	0.009	0.000	0.02700
3850.00	2.5974	1.386	0.000	0.009	0.000	0.02670
3860.00	2.5907	1.385	0.000	0.009	0.001	0.02660
3870.00	2.5840	1.386	0.000	0.009	0.002	0.02665
3880.00	2.5773	1.386	0.000	0.009	0.002	0.02670
3890.00	2.5707	1.385	0.000	0.009	0.002	0.02655
3900.00	2.5641	1.385	0.000	0.009	0.004	0.02650
3910.00	2.5575	1.387	0.000	0.009	0.005	0.02680
3920.00	2.5510	1.388	0.000	0.009	0.003	0.02685
3930.00	2.5445	1.386	0.000	0.009	0.003	0.02665
3940.00	2.5381	1.385	0.000	0.009	0.005	0.02660
3950.00	2.5316	1.387	0.000	0.009	0.006	0.02680
3960.00	2.5253	1.388	0.000	0.009	0.005	0.02685
3970.00	2.5189	1.387	0.000	0.009	0.005	0.02680
3980.00	2.5126	1.386	0.000	0.009	0.006	0.02670
3990.00	2.5063	1.388	0.000	0.009	0.007	0.02685
4000.00	2.5000	1.388	0.000	0.009	0.007	0.02695

Table 26. Diisopropyl-methylphosphonate (DIMP) PAGE 9

WN	WL	N	K	R
4001.60	2.4990	1.409	.0003470	0.02939
4033.88	2.4790	1.410	.0004130	0.02941
4066.69	2.4590	1.410	.0004930	0.02942
4100.04	2.4390	1.410	.0005650	0.02942
4133.94	2.4190	1.410	.0004530	0.02942
4168.40	2.3990	1.410	.0005510	0.02942
4203.45	2.3790	1.410	.0002570	0.02944
4239.08	2.3590	1.410	.0003410	0.02947
4275.33	2.3390	1.410	.0004540	0.02950
4312.20	2.3190	1.410	.0008830	0.02949
4349.72	2.2990	1.410	.0007800	0.02948
4387.89	2.2790	1.410	.0005680	0.02947
4426.74	2.2590	1.410	.0006390	0.02943
4466.28	2.2390	1.410	.0001820	0.02946
4506.53	2.2190	1.410	.0000960	0.02949
4547.52	2.1990	1.410	.0000750	0.02951
4589.26	2.1790	1.410	.0000700	0.02952
4631.77	2.1590	1.411	.0000620	0.02954
4675.08	2.1390	1.411	.0000570	0.02955
4719.21	2.1190	1.411	.0000510	0.02956
4764.17	2.0990	1.411	.0000500	0.02958
4810.00	2.0790	1.411	.0000470	0.02959
4856.73	2.0590	1.411	.0000430	0.02960
4904.36	2.0390	1.411	.0000310	0.02961
4952.95	2.0190	1.411	.0000310	0.02962
5002.50	1.9990	1.411	.0000370	0.02963
5053.06	1.9790	1.411	.0000350	0.02964
5104.65	1.9590	1.411	.0000350	0.02965
5157.30	1.9390	1.412	.0000470	0.02965
5211.05	1.9190	1.412	.0000460	0.02966
5265.93	1.8990	1.412	.0000420	0.02967
5321.98	1.8790	1.412	.0000270	0.02968
5379.24	1.8590	1.412	.0000220	0.02969
5437.74	1.8390	1.412	.0000230	0.02970
5497.53	1.8190	1.412	.0000260	0.02971
5558.64	1.7990	1.412	.0000460	0.02972
5621.14	1.7790	1.412	.0000340	0.02972
5685.05	1.7590	1.412	.0000540	0.02973
5750.43	1.7390	1.412	.0000680	0.02974
5817.34	1.7190	1.412	.0000860	0.02974
5885.81	1.6990	1.412	.0000730	0.02975
5955.93	1.6790	1.412	.0001050	0.02975
6027.73	1.6590	1.412	.0000130	0.02976
6101.28	1.6390	1.413	.0000070	0.02977
6176.65	1.6190	1.413	.0000080	0.02978
6273.53	1.5940	1.413	.0000050	0.02979
6353.24	1.5740	1.413	.0000050	0.02979
6435.01	1.5540	1.413	.0000050	0.02980
6518.90	1.5340	1.413	.0000040	0.02981
6605.02	1.5140	1.413	.0000050	0.02982

WN	WL	N	K	R
6693.44	1.4940	1.413	.0000070	0.02982
6784.26	1.4740	1.413	.0000060	0.02983
6877.58	1.4540	1.413	.0000090	0.02984
6973.50	1.4340	1.413	.0000080	0.02984
7072.14	1.4140	1.413	.0000090	0.02985
7173.60	1.3940	1.413	.0000120	0.02986
7278.02	1.3740	1.413	.0000120	0.02986
7385.52	1.3540	1.413	.0000090	0.02987
7496.25	1.3340	1.413	.0000020	0.02988
7610.35	1.3140	1.413	.0000010	0.02988
7727.98	1.2940	1.414	.0000010	0.02989
7849.29	1.2740	1.414	.0000010	0.02990
7974.48	1.2540	1.414	.0000020	0.02990
8103.73	1.2340	1.414	.0000020	0.02991
8237.23	1.2140	1.414	.0000030	0.02992
8375.21	1.1940	1.414	.0000070	0.02993
8517.89	1.1740	1.414	.0000110	0.02993
8665.51	1.1540	1.414	.0000040	0.02994
8818.34	1.1340	1.414	.0000030	0.02994
8976.66	1.1140	1.414	.0000010	0.02995
9140.77	1.0940	1.414	.0000010	0.02996
9310.99	1.0740	1.414	.0000010	0.02996
9487.67	1.0540	1.414	.0000010	0.02997
9671.18	1.0340	1.414	.0000010	0.02998
9861.93	1.0140	1.414	.0000010	0.02998
10060.40	0.9940	1.414	.0000010	0.02999
10266.90	0.9740	1.414	.0000010	0.03000
10482.20	0.9540	1.414	.0000010	0.03000
10706.60	0.9340	1.415	.0000010	0.03001
10940.90	0.9140	1.415	.0000010	0.03002
11185.70	0.8940	1.415	.0000010	0.03003
11441.60	0.8740	1.415	.0000010	0.03003
11709.60	0.8540	1.415	.0000010	0.03004
11990.40	0.8340	1.415	.0000000	0.03005
12285.00	0.8140	1.415	.0000000	0.03006

#### 4.23 Diethyl-Phthalate (DEP).

DEP [ $\text{C}_6\text{H}_4$ -1, 2- $(\text{CO}_2\text{C}_2\text{H}_5)_2$ ] of 99% purity was obtained from the Aldrich Chemical Co.

Acquisition of reflectance spectra in the  $180$ - $4,000\text{ cm}^{-1}$  wave-number region, transmittance spectra in the  $800$ - $2500\text{ nm}$  wavelength region, and analysis of those spectra was similar to that described in Section 4.20. Resultant reflectance spectra and spectral values of  $n$  and  $k$  are presented in Figures 48 and 49 and in Table 27.



DIETHYL-PHTHALATE (DEP)

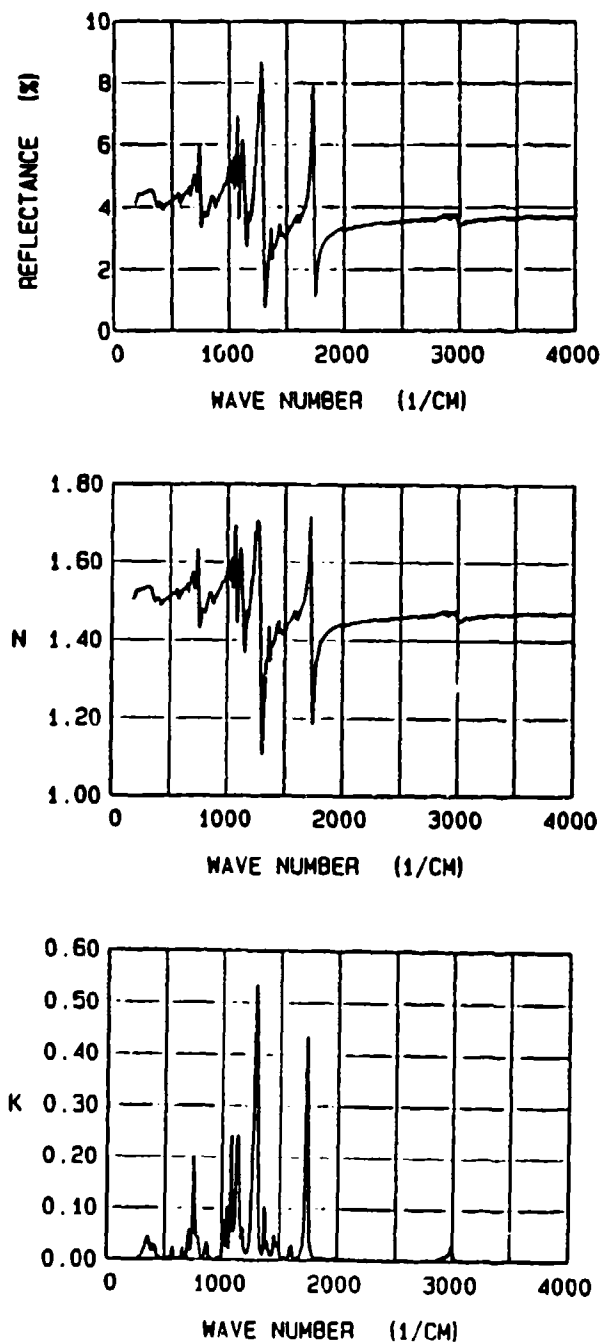


Figure 48. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) reflectance, refractive index N, and extinction coefficient K spectra of DEP. The N and K spectra are from Kramers-Kronig analysis of the reflectance spectrum.

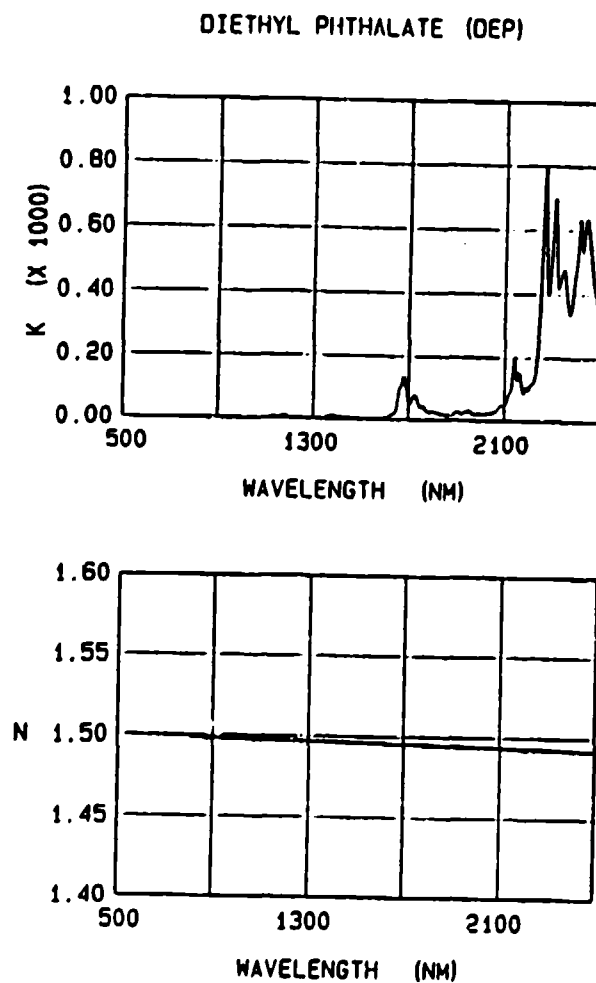


Figure 49. The extinction coefficient  $K$  and refractive index  $N$  spectra of DEP in the 800-2,500 nm region. The  $K$  spectrum was determined from transmittance measurements. The  $N$  spectrum is from Kramers-Kronig analysis of the  $K$  spectrum. .

Table 27. Diethyl-phthalate (DEP).

PAGE 1

WN	WL	N	K	DN	DK	R
180.00	55.5556	1.501	0.000	0.013	0.015	0.04085
190.00	52.6316	1.510	0.000	0.008	0.021	0.04200
200.00	50.0000	1.520	0.000	0.008	0.020	0.04335
210.00	47.6190	1.524	0.000	0.008	0.015	0.04390
220.00	45.4545	1.527	0.000	0.008	0.007	0.04425
230.00	43.4783	1.525	0.000	0.008	0.004	0.04395
240.00	41.6667	1.524	0.000	0.008	0.005	0.04390
250.00	40.0000	1.528	0.000	0.008	0.002	0.04435
260.00	38.4615	1.529	0.000	0.008	0.000	0.04455
270.00	37.0370	1.529	0.003	0.008	0.003	0.04455
280.00	35.7143	1.531	0.005	0.008	0.005	0.04475
290.00	34.4828	1.532	0.008	0.008	0.008	0.04495
300.00	33.3333	1.534	0.012	0.008	0.012	0.04520
310.00	32.2581	1.534	0.017	0.008	0.013	0.04525
320.00	31.2500	1.534	0.023	0.008	0.013	0.04530
330.00	30.3030	1.532	0.032	0.009	0.013	0.04510
340.00	29.4118	1.524	0.040	0.009	0.013	0.04405
350.00	28.5714	1.510	0.043	0.009	0.013	0.04225
360.00	27.7778	1.498	0.035	0.009	0.013	0.04060
370.00	27.0270	1.495	0.023	0.008	0.012	0.04010
380.00	26.3158	1.502	0.016	0.008	0.012	0.04100
390.00	25.6410	1.507	0.021	0.008	0.013	0.04170
400.00	25.0000	1.501	0.028	0.009	0.012	0.04095
410.00	24.3902	1.490	0.024	0.009	0.012	0.03945
420.00	23.8095	1.487	0.011	0.008	0.011	0.03900
430.00	23.2558	1.493	0.003	0.008	0.003	0.03985
440.00	22.7273	1.500	0.003	0.008	0.003	0.04065
450.00	22.2222	1.500	0.004	0.008	0.004	0.04075
460.00	21.7391	1.501	0.002	0.008	0.002	0.04080
470.00	21.2766	1.507	0.002	0.008	0.002	0.04160
480.00	20.8333	1.506	0.000	0.008	0.002	0.04145
490.00	20.4082	1.511	0.000	0.008	0.002	0.04210
500.00	20.0000	1.512	0.000	0.008	0.000	0.04225
510.00	19.6078	1.513	0.000	0.008	0.003	0.04245
520.00	19.2308	1.518	0.003	0.008	0.003	0.04310
530.00	18.8679	1.516	0.003	0.008	0.003	0.04305
540.00	18.5185	1.517	0.003	0.008	0.003	0.04290
550.00	18.1818	1.524	0.005	0.008	0.005	0.04380
560.00	17.8571	1.521	0.024	0.008	0.013	0.04350
570.00	17.5439	1.503	0.007	0.008	0.007	0.04105
580.00	17.2414	1.512	0.000	0.008	0.001	0.04220
590.00	16.9492	1.515	0.000	0.008	0.002	0.04270
600.00	16.6667	1.526	0.000	0.008	0.002	0.04405
610.00	16.3934	1.525	0.000	0.008	0.000	0.04395
620.00	16.1290	1.527	0.001	0.008	0.001	0.04425
630.00	15.8730	1.534	0.003	0.008	0.003	0.04510
640.00	15.6250	1.535	0.003	0.008	0.003	0.04525
650.00	15.3846	1.536	0.023	0.008	0.013	0.04545
660.00	15.1515	1.528	0.002	0.008	0.002	0.04435
670.00	14.9254	1.538	0.000	0.008	0.001	0.04570

Table 27. Diethyl-phthalate (DEP).

PAGE 2

WN	WL	N	K	DN	DK	R
680.00	14.7059	1.553	0.001	0.008	0.001	0.04765
690.00	14.4928	1.572	0.023	0.008	0.014	0.05030
700.00	14.2857	1.567	0.042	0.009	0.015	0.04990
710.00	14.0845	1.526	0.041	0.009	0.013	0.04440
720.00	13.8889	1.558	0.017	0.008	0.014	0.04845
730.00	13.6986	1.599	0.033	0.008	0.015	0.05410
740.00	13.5135	1.617	0.155	0.012	0.017	0.05980
750.00	13.3333	1.444	0.157	0.011	0.013	0.03760
760.00	13.1579	1.446	0.059	0.010	0.012	0.03445
770.00	12.9870	1.474	0.043	0.009	0.012	0.03760
780.00	12.8205	1.478	0.045	0.009	0.012	0.03815
790.00	12.6582	1.468	0.038	0.009	0.012	0.03685
800.00	12.5000	1.468	0.020	0.009	0.011	0.03670
810.00	12.3457	1.479	0.003	0.008	0.003	0.03795
820.00	12.1951	1.494	0.003	0.008	0.003	0.03990
830.00	12.0482	1.505	0.001	0.008	0.001	0.04140
840.00	11.9048	1.519	0.007	0.008	0.007	0.04315
850.00	11.7647	1.516	0.019	0.008	0.013	0.04280
860.00	11.6279	1.514	0.031	0.009	0.013	0.04270
870.00	11.4943	1.493	0.028	0.009	0.012	0.03985
880.00	11.3636	1.498	0.005	0.008	0.005	0.04045
890.00	11.2360	1.508	0.006	0.008	0.006	0.04175
900.00	11.1111	1.511	0.001	0.008	0.001	0.04210
910.00	10.9890	1.518	0.000	0.008	0.002	0.04305
920.00	10.8696	1.523	0.000	0.008	0.002	0.04365
930.00	10.7527	1.526	0.000	0.008	0.002	0.04405
940.00	10.6383	1.532	0.000	0.008	0.003	0.04495
950.00	10.5263	1.544	0.000	0.008	0.001	0.04645
960.00	10.4167	1.549	0.005	0.008	0.005	0.04715
970.00	10.3093	1.549	0.002	0.008	0.002	0.04715
980.00	10.2041	1.562	0.002	0.008	0.002	0.04890
990.00	10.1010	1.577	0.004	0.008	0.004	0.05090
1000.00	10.0000	1.596	0.019	0.008	0.015	0.05355
1010.00	9.9010	1.600	0.057	0.009	0.016	0.05460
1020.00	9.8039	1.554	0.070	0.009	0.015	0.04850
1030.00	9.7087	1.570	0.024	0.008	0.014	0.05015
1040.00	9.6154	1.579	0.103	0.010	0.016	0.05280
1050.00	9.5238	1.565	0.021	0.008	0.014	0.04935
1060.00	9.4340	1.546	0.036	0.008	0.017	0.06070
1070.00	9.3458	1.652	0.219	0.013	0.019	0.06915
1080.00	9.2593	1.443	0.129	0.011	0.013	0.03620
1090.00	9.1743	1.535	0.053	0.009	0.014	0.04570
1100.00	9.0909	1.579	0.062	0.009	0.015	0.05180
1110.00	9.0090	1.634	0.130	0.011	0.018	0.06120
1120.00	8.9286	1.581	0.228	0.013	0.017	0.05895
1130.00	8.8496	1.476	0.231	0.013	0.015	0.04610
1140.00	8.7719	1.388	0.185	0.012	0.013	0.03285
1150.00	8.6957	1.387	0.067	0.010	0.010	0.02755
1160.00	8.6207	1.452	0.040	0.009	0.011	0.03490
1170.00	8.5470	1.476	0.059	0.010	0.012	0.03820

Table 27. Diethyl-phthalate (DEP).

PAGE 3

WN	WL	N	K	DN	DK	R
1180.00	8.4746	1.455	0.034	0.009	0.011	0.03520
1190.00	8.4034	1.492	0.018	0.008	0.012	0.03965
1200.00	8.3333	1.517	0.015	0.008	0.013	0.04300
1210.00	8.2645	1.544	0.013	0.008	0.013	0.04650
1220.00	8.1967	1.577	0.018	0.008	0.014	0.05095
1230.00	8.1301	1.613	0.028	0.008	0.016	0.05605
1240.00	8.0645	1.675	0.074	0.009	0.018	0.06545
1250.00	8.0000	1.698	0.139	0.011	0.020	0.07050
1260.00	7.9365	1.695	0.235	0.014	0.020	0.07465
1270.00	7.8740	1.699	0.345	0.017	0.020	0.08330
1280.00	7.8125	1.549	0.503	0.018	0.016	0.08330
1290.00	7.7519	1.300	0.520	0.015	0.009	0.06585
1300.00	7.6923	1.119	0.327	0.008	0.008	0.02695
1310.00	7.6336	1.150	0.106	0.013	0.011	0.00745
1320.00	7.5758	1.249	0.042	0.012	0.007	0.01285
1330.00	7.5188	1.307	0.017	0.010	0.007	0.01815
1340.00	7.4627	1.346	0.015	0.010	0.008	0.02225
1350.00	7.4074	1.383	0.010	0.009	0.009	0.02630
1360.00	7.3529	1.434	0.034	0.009	0.011	0.03260
1370.00	7.2993	1.343	0.089	0.011	0.010	0.02330
1380.00	7.2464	1.380	0.023	0.009	0.009	0.02610
1390.00	7.1942	1.392	0.038	0.010	0.010	0.02760
1400.00	7.1429	1.389	0.020	0.009	0.009	0.02705
1410.00	7.0922	1.402	0.009	0.009	0.009	0.02860
1420.00	7.0423	1.413	0.008	0.009	0.008	0.02985
1430.00	6.9930	1.432	0.009	0.009	0.009	0.03215
1440.00	6.9444	1.450	0.027	0.009	0.011	0.03445
1450.00	6.8966	1.418	0.046	0.010	0.011	0.03080
1460.00	6.8493	1.425	0.027	0.009	0.010	0.03135
1470.00	6.8027	1.422	0.034	0.009	0.011	0.03105
1480.00	6.7568	1.414	0.026	0.009	0.010	0.03005
1490.00	6.7114	1.411	0.023	0.009	0.010	0.02965
1500.00	6.6667	1.420	0.005	0.009	0.005	0.03065
1510.00	6.6225	1.432	0.006	0.008	0.006	0.03215
1520.00	6.5789	1.436	0.002	0.008	0.002	0.03265
1530.00	6.5359	1.443	0.005	0.006	0.005	0.03345
1540.00	6.4935	1.447	0.004	0.008	0.004	0.03395
1550.00	6.4516	1.454	0.001	0.008	0.001	0.03490
1560.00	6.4103	1.458	0.005	0.008	0.005	0.03530
1570.00	6.3694	1.467	0.006	0.008	0.006	0.03645
1580.00	6.3291	1.464	0.026	0.009	0.011	0.03615
1590.00	6.2893	1.468	0.008	0.008	0.008	0.03655
1600.00	6.2500	1.461	0.028	0.009	0.011	0.03585
1610.00	6.2112	1.457	0.006	0.008	0.006	0.03520
1620.00	6.1728	1.465	0.004	0.008	0.004	0.03625
1630.00	6.1350	1.477	0.004	0.008	0.004	0.03770
1640.00	6.0976	1.482	0.003	0.008	0.003	0.03840
1650.00	6.0606	1.493	0.006	0.008	0.006	0.03985
1660.00	6.0241	1.503	0.005	0.008	0.005	0.04110
1670.00	5.9880	1.518	0.009	0.008	0.009	0.04300

Table 27. Diethyl-phthalate (DEP).

PAGE 4

WN	WL	N	K	DN	DK	R
1680.00	5.9524	1.533	0.015	0.008	0.013	0.04510
1690.00	5.9172	1.556	0.024	0.008	0.014	0.04820
1700.00	5.8824	1.600	0.035	0.008	0.015	0.05425
1710.00	5.8480	1.687	0.106	0.010	0.019	0.06780
1720.00	5.8140	1.663	0.346	0.016	0.019	0.07875
1730.00	5.7803	1.393	0.434	0.015	0.012	0.05890
1740.00	5.7471	1.185	0.260	0.010	0.010	0.02150
1750.00	5.7143	1.221	0.074	0.013	0.009	0.01120
1760.00	5.6818	1.303	0.028	0.011	0.008	0.01785
1770.00	5.6497	1.336	0.017	0.010	0.008	0.02115
1780.00	5.6180	1.357	0.009	0.009	0.008	0.02335
1790.00	5.5866	1.372	0.006	0.009	0.006	0.02510
1800.00	5.5556	1.387	0.002	0.009	0.002	0.02675
1810.00	5.5249	1.394	0.005	0.009	0.005	0.02765
1820.00	5.4945	1.402	0.004	0.009	0.004	0.02855
1830.00	5.4645	1.406	0.002	0.009	0.002	0.02900
1840.00	5.4348	1.412	0.003	0.009	0.003	0.02970
1850.00	5.4054	1.413	0.006	0.009	0.006	0.02980
1860.00	5.3763	1.416	0.003	0.009	0.003	0.03025
1870.00	5.3476	1.421	0.004	0.009	0.004	0.03075
1880.00	5.3191	1.421	0.003	0.008	0.003	0.03080
1890.00	5.2910	1.425	0.002	0.008	0.002	0.03130
1900.00	5.2632	1.427	0.003	0.008	0.003	0.03150
1910.00	5.2356	1.428	0.003	0.008	0.003	0.03170
1920.00	5.2083	1.430	0.002	0.008	0.002	0.03190
1930.00	5.1813	1.432	0.003	0.008	0.003	0.03210
1940.00	5.1546	1.433	0.003	0.008	0.003	0.03230
1950.00	5.1282	1.435	0.003	0.008	0.003	0.03250
1960.00	5.1020	1.436	0.003	0.008	0.003	0.03265
1970.00	5.0761	1.438	0.004	0.008	0.004	0.03285
1980.00	5.0505	1.439	0.006	0.008	0.006	0.03295
1990.00	5.0251	1.437	0.007	0.008	0.007	0.03275
2000.00	5.0000	1.436	0.006	0.008	0.006	0.03260
2010.00	4.9751	1.436	0.004	0.008	0.004	0.03260
2020.00	4.9505	1.438	0.003	0.008	0.003	0.03285
2030.00	4.9261	1.438	0.003	0.008	0.003	0.03290
2040.00	4.9020	1.440	0.003	0.008	0.003	0.03305
2050.00	4.8780	1.440	0.003	0.008	0.003	0.03305
2060.00	4.8544	1.440	0.002	0.008	0.002	0.03305
2070.00	4.8309	1.441	0.000	0.008	0.000	0.03320
2080.00	4.8077	1.444	0.000	0.008	0.000	0.03355
2090.00	4.7847	1.444	0.001	0.008	0.001	0.03365
2100.00	4.7619	1.444	0.002	0.008	0.002	0.03360
2110.00	4.7393	1.444	0.002	0.008	0.002	0.03365
2120.00	4.7170	1.444	0.002	0.008	0.002	0.03365
2130.00	4.6948	1.445	0.001	0.008	0.001	0.03370
2140.00	4.6729	1.446	0.001	0.008	0.001	0.03380
2150.00	4.6512	1.446	0.001	0.008	0.001	0.03380
2160.00	4.6296	1.446	0.000	0.008	0.000	0.03390
2170.00	4.6083	1.448	0.000	0.008	0.000	0.03405

Table 27. Diethyl-phthalate (DEP).

PAGE 5

WN	WL	N	K	DN	DK	R
2180.00	4.5872	1.448	0.000	0.008	0.000	0.03415
2190.00	4.5662	1.448	0.001	0.008	0.001	0.03415
2200.00	4.5455	1.448	0.000	0.008	0.000	0.03410
2210.00	4.5249	1.449	0.000	0.006	0.001	0.03420
2220.00	4.5045	1.450	0.000	0.008	0.000	0.03435
2230.00	4.4843	1.450	0.001	0.008	0.001	0.03440
2240.00	4.4643	1.450	0.001	0.008	0.001	0.03430
2250.00	4.4444	1.450	0.000	0.008	0.001	0.03435
2260.00	4.4248	1.452	0.000	0.008	0.001	0.03455
2270.00	4.4053	1.453	0.000	0.008	0.000	0.03470
2280.00	4.3860	1.453	0.001	0.008	0.001	0.03475
2290.00	4.3668	1.452	0.001	0.008	0.001	0.03460
2300.00	4.3478	1.452	0.000	0.008	0.000	0.03460
2310.00	4.3290	1.453	0.000	0.008	0.000	0.03470
2320.00	4.3103	1.452	0.001	0.008	0.001	0.03465
2330.00	4.2918	1.454	0.001	0.008	0.001	0.03480
2340.00	4.2735	1.453	0.002	0.008	0.002	0.03475
2350.00	4.2553	1.453	0.001	0.006	0.001	0.03470
2360.00	4.2373	1.452	0.002	0.008	0.002	0.03460
2370.00	4.2194	1.452	0.000	0.008	0.000	0.03460
2380.00	4.2017	1.453	0.000	0.008	0.000	0.03470
2390.00	4.1841	1.453	0.000	0.008	0.002	0.03475
2400.00	4.1667	1.455	0.000	0.008	0.002	0.03500
2410.00	4.1494	1.456	0.000	0.008	0.000	0.03505
2420.00	4.1322	1.456	0.000	0.008	0.000	0.03505
2430.00	4.1152	1.454	0.000	0.008	0.000	0.03490
2440.00	4.0984	1.455	0.000	0.008	0.000	0.03495
2450.00	4.0816	1.456	0.000	0.008	0.002	0.03515
2460.00	4.0650	1.457	0.000	0.008	0.001	0.03520
2470.00	4.0486	1.456	0.000	0.008	0.001	0.03515
2480.00	4.0323	1.456	0.000	0.008	0.001	0.03515
2490.00	4.0161	1.456	0.000	0.008	0.001	0.03515
2500.00	4.0000	1.458	0.000	0.008	0.002	0.03535
2510.00	3.9841	1.457	0.000	0.008	0.001	0.03525
2520.00	3.9683	1.458	0.000	0.008	0.001	0.03540
2530.00	3.9526	1.459	0.000	0.008	0.000	0.03545
2540.00	3.9370	1.458	0.000	0.008	0.001	0.03530
2550.00	3.9216	1.458	0.000	0.008	0.000	0.03535
2560.00	3.9063	1.458	0.000	0.008	0.001	0.03540
2570.00	3.8911	1.460	0.000	0.008	0.001	0.03555
2580.00	3.8760	1.459	0.000	0.008	0.001	0.03545
2590.00	3.8610	1.459	0.000	0.008	0.001	0.03550
2600.00	3.8462	1.460	0.000	0.008	0.001	0.03555
2610.00	3.8314	1.460	0.000	0.008	0.002	0.03565
2620.00	3.8168	1.461	0.000	0.008	0.001	0.03575
2630.00	3.8023	1.460	0.001	0.008	0.001	0.03565
2640.00	3.7879	1.458	0.001	0.008	0.001	0.03540
2650.00	3.7736	1.458	0.000	0.008	0.002	0.03540
2660.00	3.7594	1.460	0.000	0.008	0.003	0.03560
2670.00	3.7453	1.462	0.000	0.008	0.002	0.03585

Table 27. Diethyl-phthalate (DEP).

PAGE 6

WN	WL	N	K	DN	DK	R
2680.00	3.7313	1.462	0.000	0.008	0.001	0.03590
2690.00	3.7175	1.462	0.000	0.008	0.001	0.03580
2700.00	3.7037	1.462	0.000	0.008	0.002	0.03580
2710.00	3.6900	1.462	0.000	0.008	0.002	0.03590
2720.00	3.6765	1.463	0.000	0.008	0.003	0.03595
2730.00	3.6630	1.465	0.000	0.008	0.002	0.03625
2740.00	3.6496	1.465	0.000	0.008	0.001	0.03625
2750.00	3.6364	1.464	0.000	0.008	0.000	0.03615
2760.00	3.6232	1.464	0.000	0.008	0.000	0.03615
2770.00	3.6101	1.464	0.001	0.008	0.001	0.03610
2780.00	3.5971	1.462	0.001	0.008	0.001	0.03590
2790.00	3.5842	1.461	0.000	0.008	0.002	0.03570
2800.00	3.5714	1.464	0.000	0.008	0.004	0.03615
2810.00	3.5587	1.467	0.000	0.008	0.003	0.03650
2820.00	3.5461	1.468	0.000	0.008	0.001	0.03665
2830.00	3.5336	1.467	0.001	0.008	0.001	0.03650
2840.00	3.5211	1.467	0.000	0.008	0.001	0.03650
2850.00	3.5088	1.470	0.000	0.008	0.001	0.03685
2860.00	3.4965	1.473	0.003	0.008	0.003	0.03720
2870.00	3.4843	1.468	0.005	0.008	0.005	0.03665
2880.00	3.4722	1.466	0.003	0.008	0.003	0.03640
2890.00	3.4602	1.473	0.005	0.008	0.005	0.03725
2900.00	3.4483	1.475	0.010	0.008	0.010	0.03755
2910.00	3.4364	1.460	0.003	0.008	0.003	0.03565
2920.00	3.4247	1.469	0.007	0.008	0.007	0.03670
2930.00	3.4130	1.473	0.012	0.008	0.011	0.03730
2940.00	3.4014	1.471	0.009	0.008	0.009	0.03700
2950.00	3.3898	1.473	0.010	0.008	0.010	0.03730
2960.00	3.3784	1.469	0.013	0.008	0.011	0.03670
2970.00	3.3670	1.474	0.018	0.008	0.012	0.03735
2980.00	3.3557	1.461	0.030	0.009	0.011	0.03590
2990.00	3.3445	1.449	0.024	0.009	0.011	0.03430
3000.00	3.3333	1.445	0.015	0.009	0.011	0.03375
3010.00	3.3223	1.448	0.006	0.008	0.006	0.03415
3020.00	3.3113	1.450	0.002	0.008	0.002	0.03435
3030.00	3.3003	1.454	0.001	0.008	0.001	0.03480
3040.00	3.2895	1.451	0.000	0.008	0.000	0.03445
3050.00	3.2787	1.460	0.001	0.008	0.001	0.03560
3060.00	3.2680	1.459	0.002	0.008	0.002	0.03550
3070.00	3.2573	1.458	0.002	0.008	0.002	0.03530
3080.00	3.2468	1.458	0.003	0.008	0.003	0.03535
3090.00	3.2362	1.456	0.001	0.008	0.001	0.03505
3100.00	3.2258	1.456	0.000	0.008	0.001	0.03510
3110.00	3.2154	1.458	0.000	0.008	0.002	0.03540
3120.00	3.2051	1.460	0.000	0.008	0.001	0.03560
3130.00	3.1949	1.459	0.000	0.008	0.001	0.03545
3140.00	3.1847	1.459	0.000	0.008	0.002	0.03550
3150.00	3.1746	1.461	0.000	0.008	0.003	0.03570
3160.00	3.1646	1.462	0.000	0.008	0.003	0.03585
3170.00	3.1546	1.462	0.000	0.008	0.002	0.03590



Table 27. Diethyl-phthalate (DEP).

PAGE 7

WN	WL	N	K	DN	DK	R
3180.00	3.1447	1.463	0.000	0.008	0.001	0.03595
3190.00	3.1348	1.463	0.000	0.008	0.000	0.03595
3200.00	3.1250	1.462	0.000	0.008	0.000	0.03590
3210.00	3.1153	1.461	0.001	0.008	0.001	0.03575
3220.00	3.1056	1.460	0.000	0.008	0.001	0.03560
3230.00	3.0960	1.461	0.000	0.008	0.003	0.03570
3240.00	3.0864	1.463	0.000	0.008	0.003	0.03595
3250.00	3.0769	1.464	0.000	0.008	0.002	0.03610
3260.00	3.0675	1.463	0.000	0.008	0.001	0.03600
3270.00	3.0581	1.463	0.000	0.008	0.001	0.03600
3280.00	3.0488	1.464	0.000	0.008	0.002	0.03605
3290.00	3.0395	1.464	0.000	0.008	0.001	0.03610
3300.00	3.0303	1.463	0.000	0.008	0.000	0.03595
3310.00	3.0211	1.463	0.000	0.008	0.002	0.03595
3320.00	3.0120	1.463	0.000	0.008	0.003	0.03595
3330.00	3.0030	1.464	0.000	0.008	0.003	0.03610
3340.00	2.9940	1.465	0.000	0.008	0.002	0.03620
3350.00	2.9851	1.465	0.000	0.008	0.002	0.03625
3360.00	2.9762	1.466	0.000	0.008	0.001	0.03630
3370.00	2.9674	1.464	0.000	0.008	0.001	0.03615
3380.00	2.9586	1.465	0.000	0.008	0.002	0.03625
3390.00	2.9499	1.466	0.000	0.008	0.002	0.03630
3400.00	2.9412	1.466	0.000	0.008	0.001	0.03635
3410.00	2.9326	1.465	0.000	0.008	0.000	0.03625
3420.00	2.9240	1.465	0.000	0.008	0.001	0.03625
3430.00	2.9155	1.464	0.000	0.008	0.001	0.03615
3440.00	2.9070	1.466	0.000	0.008	0.002	0.03630
3450.00	2.8986	1.465	0.000	0.008	0.002	0.03625
3460.00	2.8902	1.465	0.000	0.008	0.002	0.03625
3470.00	2.8818	1.466	0.000	0.008	0.001	0.03635
3480.00	2.8736	1.466	0.000	0.008	0.002	0.03640
3490.00	2.8653	1.466	0.000	0.008	0.001	0.03635
3500.00	2.8571	1.466	0.000	0.008	0.001	0.03640
3510.00	2.8490	1.466	0.000	0.008	0.000	0.03640
3520.00	2.8409	1.465	0.000	0.008	0.001	0.03620
3530.00	2.8329	1.464	0.000	0.008	0.002	0.03615
3540.00	2.8249	1.466	0.000	0.008	0.003	0.03635
3550.00	2.8169	1.467	0.000	0.008	0.003	0.03645
3560.00	2.8090	1.467	0.000	0.008	0.003	0.03650
3570.00	2.8011	1.467	0.000	0.008	0.003	0.03645
3580.00	2.7933	1.468	0.000	0.008	0.003	0.03660
3590.00	2.7855	1.468	0.000	0.008	0.002	0.03655
3600.00	2.7778	1.469	0.000	0.008	0.002	0.03670
3610.00	2.7701	1.469	0.000	0.008	0.001	0.03675
3620.00	2.7624	1.469	0.000	0.008	0.001	0.03675
3630.00	2.7548	1.468	0.001	0.008	0.001	0.03660
3640.00	2.7473	1.466	0.000	0.008	0.001	0.03640
3650.00	2.7397	1.467	0.000	0.008	0.001	0.03645
3660.00	2.7322	1.467	0.000	0.008	0.001	0.03645
3670.00	2.7248	1.468	0.000	0.008	0.001	0.03655

Table 27. Diethyl-phthalate (DEP).

PAGE 8

WN	WL	N	K	DN	DK	R
3680.00	2.7174	1.466	0.000	0.008	0.002	0.03635
3690.00	2.7100	1.468	0.000	0.008	0.003	0.03655
3700.00	2.7027	1.468	0.000	0.008	0.002	0.03660
3710.00	2.6954	1.468	0.000	0.008	0.003	0.03665
3720.00	2.6882	1.469	0.000	0.008	0.001	0.03675
3730.00	2.6810	1.469	0.000	0.008	0.000	0.03670
3740.00	2.6738	1.468	0.000	0.008	0.000	0.03655
3750.00	2.6667	1.467	0.000	0.008	0.002	0.03650
3760.00	2.6596	1.469	0.000	0.008	0.002	0.03670
3770.00	2.6525	1.469	0.000	0.008	0.000	0.03670
3780.00	2.6455	1.466	0.000	0.008	0.000	0.03640
3790.00	2.6385	1.466	0.000	0.008	0.002	0.03635
3800.00	2.6316	1.467	0.000	0.008	0.003	0.03650
3810.00	2.6247	1.469	0.000	0.008	0.003	0.03670
3820.00	2.6178	1.468	0.000	0.008	0.001	0.03665
3830.00	2.6110	1.466	0.000	0.008	0.001	0.03640
3840.00	2.6042	1.465	0.000	0.008	0.002	0.03625
3850.00	2.5974	1.465	0.000	0.008	0.005	0.03620
3860.00	2.5907	1.468	0.000	0.008	0.006	0.03660
3870.00	2.5840	1.469	0.000	0.008	0.005	0.03670
3880.00	2.5773	1.470	0.000	0.008	0.005	0.03685
3890.00	2.5707	1.470	0.000	0.008	0.003	0.03685
3900.00	2.5641	1.469	0.000	0.008	0.003	0.03675
3910.00	2.5575	1.469	0.000	0.008	0.003	0.03670
3920.00	2.5510	1.468	0.000	0.008	0.003	0.03665
3930.00	2.5445	1.468	0.000	0.008	0.003	0.03665
3940.00	2.5381	1.468	0.000	0.008	0.003	0.03655
3950.00	2.5316	1.467	0.000	0.008	0.004	0.03650
3960.00	2.5253	1.466	0.000	0.008	0.005	0.03635
3970.00	2.5189	1.465	0.000	0.008	0.007	0.03625
3980.00	2.5126	1.466	0.000	0.008	0.010	0.03635
3990.00	2.5063	1.469	0.000	0.008	0.011	0.03675
4000.00	2.5000	1.471	0.000	0.008	0.011	0.03700

Table 27. Diethyl-phthalate (DEP).

PAGE 9

WN	WL	N	K	R
4000.80	2.4995	1.492	.0002600	0.03968
4016.87	2.4895	1.492	.0003240	0.03970
4033.07	2.4795	1.492	.0003930	0.03970
4049.40	2.4695	1.492	.0004370	0.03971
4065.87	2.4595	1.492	.0005000	0.03972
4082.47	2.4495	1.492	.0005800	0.03972
4099.20	2.4395	1.492	.0006390	0.03971
4116.07	2.4295	1.492	.0005750	0.03970
4133.09	2.4195	1.492	.0005590	0.03972
4150.24	2.4095	1.492	.0006280	0.03970
4167.53	2.3995	1.492	.0004870	0.03970
4184.98	2.3895	1.492	.0004280	0.03971
4202.56	2.3795	1.492	.0003510	0.03972
4220.30	2.3695	1.493	.0003390	0.03974
4238.19	2.3595	1.493	.0003890	0.03975
4256.22	2.3495	1.493	.0004650	0.03976
4274.42	2.3395	1.493	.0004730	0.03976
4292.77	2.3295	1.493	.0004410	0.03976
4311.27	2.3195	1.493	.0004190	0.03978
4329.94	2.3095	1.493	.0006050	0.03979
4348.77	2.2995	1.493	.0006910	0.03976
4367.77	2.2895	1.493	.0005070	0.03976
4386.93	2.2795	1.493	.0003940	0.03977
4406.26	2.2695	1.493	.0005150	0.03980
4425.76	2.2595	1.493	.0007990	0.03977
4445.43	2.2495	1.493	.0005080	0.03974
4465.28	2.2395	1.493	.0002700	0.03975
4485.31	2.2295	1.493	.0001700	0.03977
4505.52	2.2195	1.493	.0001190	0.03979
4525.91	2.2095	1.493	.0001190	0.03980
4546.49	2.1995	1.493	.0000980	0.03981
4567.25	2.1895	1.493	.0001090	0.03982
4588.21	2.1795	1.493	.0000860	0.03983
4609.36	2.1695	1.493	.0001190	0.03984
4630.70	2.1595	1.493	.0001520	0.03985
4652.24	2.1495	1.493	.0001280	0.03985
4673.99	2.1395	1.493	.0001970	0.03985
4695.94	2.1295	1.493	.0001080	0.03986
4718.09	2.1195	1.494	.0000860	0.03987
4740.46	2.1095	1.494	.0000620	0.03987
4763.04	2.0995	1.494	.0000470	0.03988
4785.83	2.0895	1.494	.0000460	0.03989
4808.85	2.0795	1.494	.0000470	0.03990
4832.08	2.0695	1.494	.0000350	0.03990
4855.55	2.0595	1.494	.0000280	0.03991
4879.24	2.0495	1.494	.0000250	0.03992
4903.16	2.0395	1.494	.0000240	0.03993
4927.32	2.0295	1.494	.0000220	0.03993
4951.72	2.0195	1.494	.0000200	0.03994
4976.36	2.0095	1.494	.0000190	0.03994

Table 27. Diethyl-phthalate (DEP).

PAGE 10

WN	WL	N	K	R
5001.25	1.9995	1.494	.0000190	0.03995
5026.39	1.9895	1.494	.0000200	0.03996
5051.78	1.9795	1.494	.0000180	0.03996
5077.43	1.9695	1.494	.0000190	0.03997
5103.34	1.9595	1.494	.0000260	0.03998
5129.52	1.9495	1.494	.0000320	0.03998
5155.97	1.9395	1.494	.0000290	0.03999
5182.69	1.9295	1.495	.0000220	0.03999
5209.69	1.9195	1.495	.0000210	0.04000
5236.97	1.9095	1.495	.0000270	0.04000
5264.54	1.8995	1.495	.0000270	0.04001
5292.41	1.8895	1.495	.0000200	0.04002
5320.56	1.8795	1.495	.0000170	0.04002
5349.02	1.8695	1.495	.0000160	0.04003
5377.79	1.8595	1.495	.0000160	0.04003
5406.87	1.8495	1.495	.0000160	0.04004
5436.26	1.8395	1.495	.0000190	0.04004
5465.97	1.8295	1.495	.0000210	0.04005
5496.02	1.8195	1.495	.0000220	0.04006
5526.39	1.8095	1.495	.0000240	0.04006
5557.10	1.7995	1.495	.0000270	0.04007
5588.15	1.7895	1.495	.0000270	0.04007
5619.56	1.7795	1.495	.0000240	0.04008
5651.31	1.7695	1.495	.0000290	0.04008
5683.43	1.7595	1.495	.0000440	0.04009
5715.92	1.7495	1.495	.0000380	0.04009
5748.78	1.7395	1.495	.0000440	0.04010
5782.02	1.7295	1.495	.0000730	0.04011
5815.64	1.7195	1.495	.0000780	0.04011
5849.66	1.7095	1.495	.0000560	0.04011
5884.08	1.6995	1.496	.0000520	0.04012
5918.91	1.6895	1.496	.0001020	0.04012
5954.15	1.6795	1.496	.0001370	0.04013
5989.82	1.6695	1.496	.0001120	0.04012
6025.91	1.6595	1.496	.0000980	0.04013
6062.44	1.6495	1.496	.0000400	0.04013
6099.42	1.6395	1.496	.0000180	0.04014
6136.85	1.6295	1.496	.0000160	0.04014
6174.75	1.6195	1.496	.0000110	0.04015
6213.11	1.6095	1.496	.0000060	0.04015
6251.95	1.5995	1.496	.0000050	0.04016
6291.29	1.5895	1.496	.0000030	0.04017
6331.12	1.5795	1.496	.0000020	0.04017
6371.46	1.5695	1.496	.0000020	0.04018
6412.31	1.5595	1.496	.0000020	0.04018
6453.69	1.5495	1.496	.0000010	0.04019
6495.62	1.5395	1.496	.0000010	0.04019
6538.08	1.5295	1.496	.0000010	0.04020
6581.11	1.5195	1.496	.0000020	0.04020
6624.71	1.5095	1.496	.0000020	0.04021

Table 27. Diethyl-phthalate (DEP).

PAGE 11

WN	WL	N	K	R
6668.89	1.4995	1.496	.0000020	0.04021
6713.66	1.4895	1.496	.0000020	0.04022
6759.04	1.4795	1.496	.0000030	0.04022
6805.04	1.4695	1.496	.0000030	0.04023
6851.66	1.4595	1.496	.0000040	0.04023
6898.93	1.4495	1.496	.0000040	0.04023
6946.86	1.4395	1.496	.0000040	0.04024
6995.45	1.4295	1.496	.0000050	0.04024
7044.73	1.4195	1.497	.0000060	0.04025
7094.71	1.4095	1.497	.0000070	0.04025
7145.41	1.3995	1.497	.0000090	0.04026
7196.83	1.3895	1.497	.0000100	0.04026
7249.00	1.3795	1.497	.0000100	0.04027
7301.94	1.3695	1.497	.0000090	0.04027
7355.65	1.3595	1.497	.0000070	0.04028
7410.15	1.3495	1.497	.0000050	0.04028
7465.47	1.3395	1.497	.0000020	0.04028
7521.62	1.3295	1.497	.0000010	0.04029
7578.63	1.3195	1.497	.0000010	0.04030
7636.50	1.3095	1.497	.0000010	0.04030
7695.27	1.2995	1.497	.0000010	0.04030
7754.94	1.2895	1.497	.0000010	0.04031
7815.55	1.2795	1.497	.0000010	0.04031
7877.12	1.2695	1.497	.0000010	0.04032
7939.66	1.2595	1.497	.0000010	0.04032
8003.20	1.2495	1.497	.0000010	0.04033
8067.77	1.2395	1.497	.0000010	0.04033
8133.39	1.2295	1.497	.0000010	0.04034
8200.08	1.2195	1.497	.0000010	0.04034
8267.86	1.2095	1.497	.0000020	0.04034
8336.81	1.1995	1.497	.0000030	0.04035
8406.89	1.1895	1.497	.0000060	0.04035
8478.17	1.1795	1.497	.0000100	0.04036
8550.66	1.1695	1.497	.0000070	0.04036
8624.41	1.1595	1.497	.0000050	0.04037
8699.43	1.1495	1.497	.0000040	0.04037
8775.78	1.1395	1.498	.0000070	0.04038
8853.47	1.1295	1.498	.0000060	0.04038
8932.56	1.1195	1.498	.0000030	0.04038
9013.07	1.1095	1.498	.0000010	0.04039
9095.04	1.0995	1.498	.0000010	0.04039
9178.52	1.0895	1.498	.0000010	0.04040
9263.55	1.0795	1.498	.0000000	0.04040
9350.16	1.0695	1.498	.0000000	0.04041
9438.41	1.0595	1.498	.0000000	0.04041
9528.35	1.0495	1.498	.0000000	0.04042
9620.01	1.0395	1.498	.0000010	0.04042
9713.45	1.0295	1.498	.0000010	0.04043
9808.73	1.0195	1.498	.0000010	0.04043
9905.89	1.0095	1.498	.0000010	0.04044

WN	WL	N	K	R
10005.00	0.9995	1.498	.00000010	0.04044
10106.10	0.9895	1.498	.00000000	0.04045
10209.30	0.9795	1.498	.00000000	0.04045
10314.60	0.9695	1.498	.00000000	0.04046
10422.10	0.9595	1.498	.00000000	0.04046
10531.90	0.9495	1.498	.00000000	0.04047
10644.00	0.9395	1.498	.00000000	0.04047
10758.50	0.9295	1.498	.00000000	0.04048
10875.50	0.9195	1.498	.00000000	0.04048
10995.10	0.9095	1.498	.00000010	0.04049
11117.30	0.8995	1.498	.00000010	0.04049
11242.30	0.8895	1.498	.00000000	0.04050
11370.10	0.8795	1.498	.00000000	0.04050
11500.90	0.8695	1.499	.00000000	0.04051
11634.70	0.8595	1.499	.00000000	0.04051
11771.60	0.8495	1.499	.00000000	0.04052
11911.90	0.8395	1.499	.00000000	0.04052
12055.50	0.8295	1.499	.00000000	0.04053
12202.60	0.8195	1.499	.00000000	0.04053
12353.30	0.8095	1.499	.00000000	0.04054

#### 4.24 Diethyl Sulfite (DES).

DES  $[\text{CH}_3\text{CH}_2)_2\text{S}]$  of 98% purity was obtained from the Aldrich Chemical Co.

DES has a very high vapor pressure, thus direct acquisition of reflectance spectra using the open dish method was impossible; the sample would evaporate before we could make a single scan of the infrared spectral region. The wedge-shaped cell was used to measure a group of transmittance spectra for DES in the 510-37,000  $\text{cm}^{-1}$  wave-number region. Spectral values of  $k$  were determined directly from the transmittance spectra,  $n$  values were determined by Kramers-Kronig analysis of the  $k$  spectrum, and the reflectance spectrum was computed using the Fresnel equation for s-polarization and the values of  $n$  and  $k$ .

Spectral values of  $k$ ,  $n$ , and reflectance are presented in Figures 50 and 51 and in Table 28.

DIETHYL-SULFITE (DES)

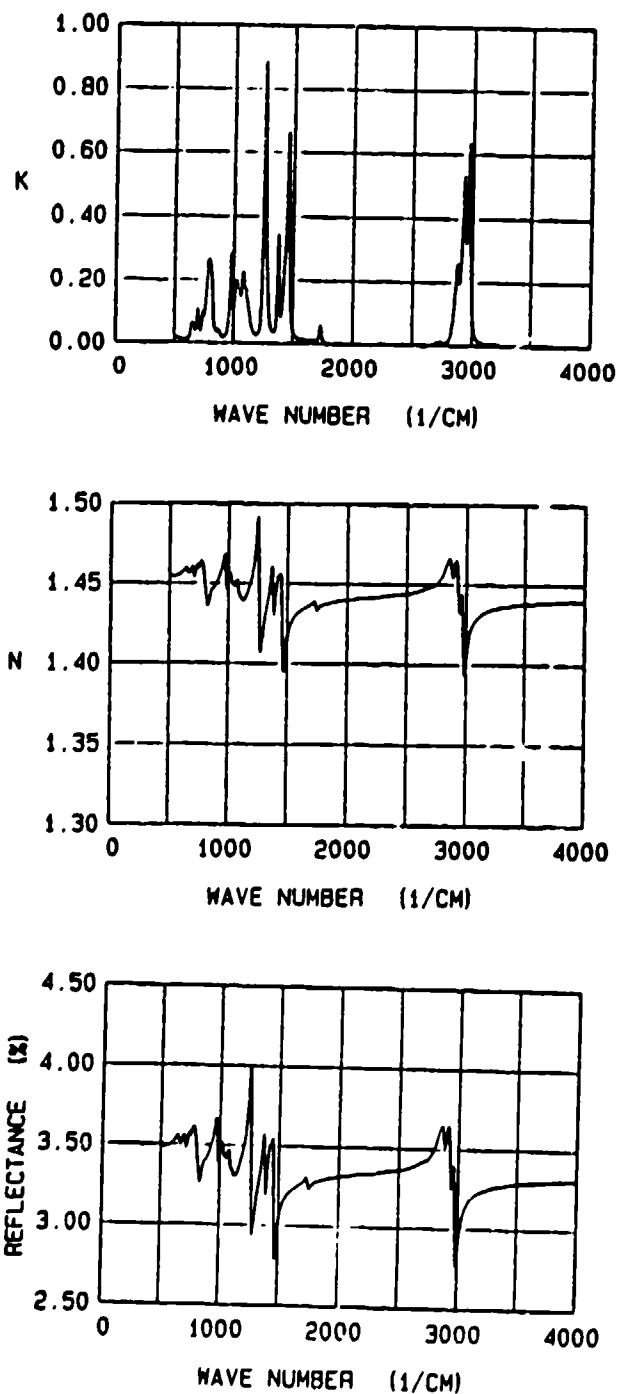


Figure 50. The infrared ( $180\text{--}4,000\text{ cm}^{-1}$ ) extinction coefficient  $K$  and refractive index  $N$  spectra of DES. The  $N$  spectrum was determined from Kramers-Kronig analysis of the  $K$  spectrum. The reflectance spectrum was computed from  $N$  and  $K$ .



# DIETHYL SULFITE

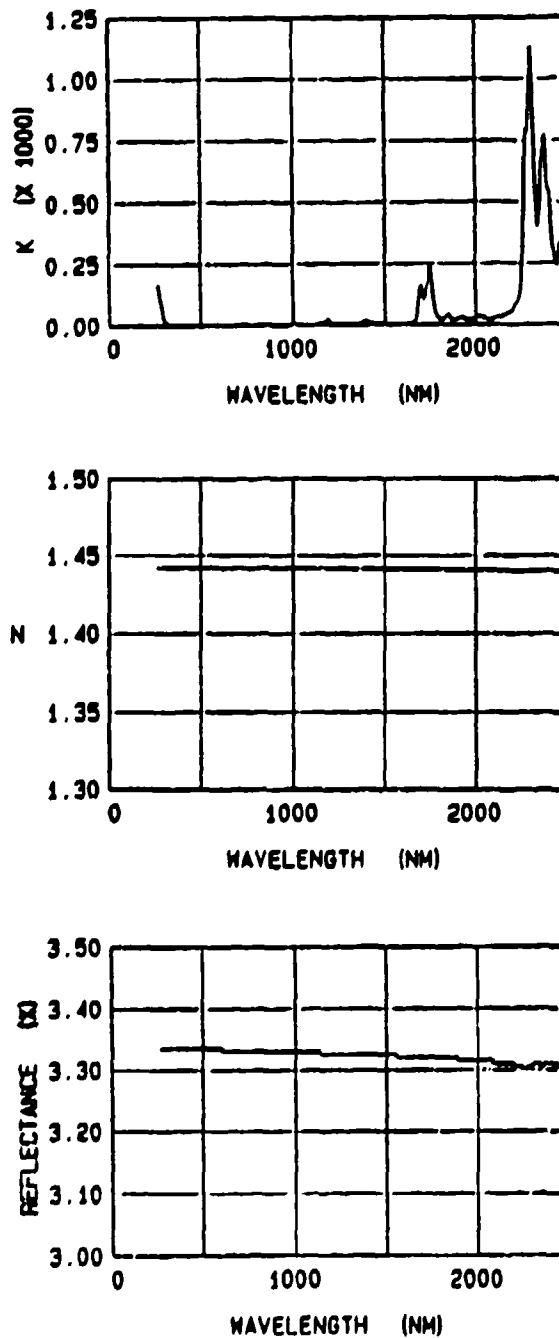


Figure 51. The extinction coefficient  $K$  and refractive index  $N$  spectra of DES in the 270–2,500 nm region. The  $K$  spectrum was determined from transmittance measurements. The  $N$  spectrum is from Kramers-Kronig analysis of the  $K$  spectrum.

Table 28. Diethyl-sulfite (DES).

PAGE 1

WN	WL	N	K	R
510.00	19.6078	1.454	.0020880	0.03487
520.00	19.2308	1.454	.0018280	0.03486
530.00	18.8679	1.454	.0016490	0.03487
540.00	18.5185	1.454	.0014880	0.03487
550.00	18.1818	1.454	.0013630	0.03490
560.00	17.8571	1.455	.0013880	0.03494
570.00	17.5439	1.455	.0014040	0.03497
580.00	17.2414	1.455	.0013160	0.03501
590.00	16.9492	1.456	.0012040	0.03508
600.00	16.6667	1.457	.0013100	0.03518
610.00	16.3934	1.458	.0015960	0.03530
620.00	16.1290	1.459	.0023240	0.03545
630.00	15.8730	1.460	.0045710	0.03558
640.00	15.6250	1.458	.0068620	0.03531
650.00	15.3848	1.457	.0057530	0.03520
660.00	15.1515	1.456	.0054830	0.03510
670.00	14.9254	1.458	.0039020	0.03534
680.00	14.7059	1.460	.0062660	0.03561
690.00	14.4928	1.458	.0106870	0.03535
700.00	14.2857	1.453	.0079500	0.03479
710.00	14.0845	1.456	.0041520	0.03508
720.00	13.8889	1.459	.0041280	0.03552
730.00	13.6986	1.462	.0079200	0.03584
740.00	13.5135	1.460	.0104650	0.03560
750.00	13.3333	1.461	.0083940	0.03575
760.00	13.1579	1.464	.0128190	0.03615
770.00	12.9870	1.463	.0174240	0.03608
780.00	12.8205	1.461	.0237840	0.03581
790.00	12.6582	1.453	.0269970	0.03487
800.00	12.5000	1.447	.0258210	0.03408
810.00	12.3457	1.441	.0230860	0.03326
820.00	12.1951	1.436	.0163120	0.03269
830.00	12.0482	1.437	.0082540	0.03276
840.00	11.9048	1.441	.0048370	0.03328
850.00	11.7647	1.445	.0039780	0.03367
860.00	11.6279	1.447	.0043180	0.03391
870.00	11.4943	1.447	.0044330	0.03400
880.00	11.3636	1.448	.0036600	0.03408
890.00	11.2360	1.449	.0026180	0.03423
900.00	11.1111	1.451	.0021160	0.03444
910.00	10.9890	1.453	.0019940	0.03468
920.00	10.8696	1.455	.0021650	0.03492
930.00	10.7527	1.457	.0025630	0.03519
940.00	10.6383	1.459	.0034490	0.03553
950.00	10.5263	1.463	.0055440	0.03600
960.00	10.4167	1.468	.0111650	0.03667
970.00	10.3093	1.463	.0267410	0.03606
980.00	10.2041	1.446	.0229090	0.03396
990.00	10.1010	1.449	.0114580	0.03423
1000.00	10.0000	1.455	.0120000	0.03501

Table 28. Diethyl-sulfite (DES).

PAGE 2

WN	WL	N	X	Z
1010.00	9.9010	1.456	.0178460	0.03511
1020.00	9.8039	1.452	.0198380	0.03461
1030.00	9.7087	1.449	.0181730	0.03431
1040.00	9.6154	1.449	.0172660	0.03420
1050.00	9.5238	1.448	.0156140	0.03418
1060.00	9.4340	1.451	.0157310	0.03452
1070.00	9.3458	1.450	.0221940	0.03438
1080.00	9.2593	1.443	.0207770	0.03358
1090.00	9.1743	1.443	.0177190	0.03350
1100.00	9.0909	1.441	.0173720	0.03326
1110.00	9.0090	1.439	.0142570	0.03303
1120.00	8.9286	1.439	.0116690	0.03304
1130.00	8.8496	1.440	.0090440	0.03308
1140.00	8.7719	1.441	.0066310	0.03325
1150.00	8.6957	1.443	.0047890	0.03351
1160.00	8.6207	1.446	.0039230	0.03379
1170.00	8.5470	1.448	.0032530	0.03407
1180.00	8.4746	1.450	.0028980	0.03439
1190.00	8.4034	1.453	.0029010	0.03474
1200.00	8.3333	1.456	.0031010	0.03515
1210.00	8.2645	1.461	.0035110	0.03570
1220.00	8.1967	1.468	.0049410	0.03655
1230.00	8.1301	1.478	.0105220	0.03786
1240.00	8.0645	1.490	.0278960	0.03955
1250.00	8.0000	1.482	.0705720	0.03912
1260.00	7.9365	1.424	.0827380	0.03230
1270.00	7.8740	1.407	.0376340	0.02935
1280.00	7.8125	1.413	.0238160	0.02997
1290.00	7.7519	1.418	.0131290	0.03050
1300.00	7.6923	1.425	.0076030	0.03130
1310.00	7.6336	1.431	.0054760	0.03196
1320.00	7.5758	1.435	.0044120	0.03247
1330.00	7.5188	1.439	.0036870	0.03295
1340.00	7.4627	1.443	.0036310	0.03346
1350.00	7.4074	1.448	.0040780	0.03412
1360.00	7.3529	1.456	.0082880	0.03511
1370.00	7.2993	1.456	.0282030	0.03526
1380.00	7.2464	1.434	.0295170	0.03253
1390.00	7.1942	1.435	.0098870	0.03250
1400.00	7.1429	1.445	.0088750	0.03371
1410.00	7.0922	1.452	.0126820	0.03457
1420.00	7.0423	1.455	.0213940	0.03509
1430.00	6.9930	1.454	.0282970	0.03493
1440.00	6.9444	1.457	.0400640	0.03546
1450.00	6.8966	1.436	.0666030	0.03336
1460.00	6.8493	1.401	.0499080	0.02879
1470.00	6.8027	1.397	.0202110	0.02803
1480.00	6.7568	1.407	.0082490	0.02918
1490.00	6.7114	1.415	.0051150	0.03006
1500.00	6.6667	1.419	.0036840	0.03056

Table 28. Diethyl-sulfite (DES).

PAGE 3

WN	WL	N	K	R
1510.00	6.6225	1.422	.0028210	0.03093
1520.00	6.5789	1.424	.0023270	0.03120
1530.00	6.5359	1.426	.0019720	0.03142
1540.00	6.4935	1.428	.0017310	0.03159
1550.00	6.4516	1.429	.0015900	0.03174
1560.00	6.4103	1.430	.0015140	0.03187
1570.00	6.3694	1.431	.0015040	0.03198
1580.00	6.3291	1.431	.0015570	0.03205
1590.00	6.2893	1.432	.0013630	0.03213
1600.00	6.2500	1.433	.0014550	0.03221
1610.00	6.2112	1.433	.0013510	0.03225
1620.00	6.1728	1.433	.0012280	0.03231
1630.00	6.1350	1.434	.0011630	0.03237
1640.00	6.0976	1.434	.0011410	0.03243
1650.00	6.0606	1.435	.0011140	0.03248
1660.00	6.0241	1.435	.0010840	0.03252
1670.00	5.9880	1.436	.0010750	0.03257
1680.00	5.9524	1.436	.0010960	0.03263
1690.00	5.9172	1.436	.0011140	0.03268
1700.00	5.8824	1.437	.0011560	0.03276
1710.00	5.8480	1.438	.0014780	0.03289
1720.00	5.8140	1.439	.0036330	0.03299
1730.00	5.7803	1.437	.0061350	0.03270
1740.00	5.7471	1.434	.0044310	0.03235
1750.00	5.7143	1.434	.0018180	0.03234
1760.00	5.6818	1.435	.0008740	0.03247
1770.00	5.6497	1.436	.0006110	0.03256
1780.00	5.6180	1.436	.0004880	0.03263
1790.00	5.5866	1.436	.0004390	0.03267
1800.00	5.5556	1.437	.0004110	0.03271
1810.00	5.5249	1.437	.0003860	0.03274
1820.00	5.4945	1.437	.0003280	0.03277
1830.00	5.4645	1.438	.0002850	0.03280
1840.00	5.4348	1.438	.0002650	0.03283
1850.00	5.4054	1.438	.0002250	0.03285
1860.00	5.3763	1.438	.0001940	0.03287
1870.00	5.3476	1.438	.0002010	0.03290
1880.00	5.3191	1.439	.0002280	0.03292
1890.00	5.2910	1.439	.0002340	0.03294
1900.00	5.2632	1.439	.0002180	0.03296
1910.00	5.2356	1.439	.0002250	0.03298
1920.00	5.2083	1.439	.0002690	0.03300
1930.00	5.1813	1.439	.0003220	0.03301
1940.00	5.1546	1.439	.0003440	0.03302
1950.00	5.1282	1.439	.0003280	0.03303
1960.00	5.1020	1.440	.0003120	0.03304
1970.00	5.0761	1.440	.0002980	0.03306
1980.00	5.0505	1.440	.0003010	0.03307
1990.00	5.0251	1.440	.0003040	0.03309
2000.00	5.0000	1.440	.0003480	0.03310

Table 28. Diethyl-sulfite (DES).

PAGE 4

WN	WL	N	K	R
2010.00	4.9751	1.440	.0004210	0.03311
2020.00	4.9505	1.440	.0003870	0.03311
2030.00	4.9261	1.440	.0002890	0.03312
2040.00	4.9020	1.440	.0002360	0.03314
2050.00	4.8780	1.440	.0002530	0.03315
2060.00	4.8544	1.441	.0003020	0.03317
2070.00	4.8309	1.441	.0003140	0.03317
2080.00	4.8077	1.441	.0002720	0.03318
2090.00	4.7847	1.441	.0002370	0.03319
2100.00	4.7619	1.441	.0002440	0.03321
2110.00	4.7393	1.441	.0002970	0.03322
2120.00	4.7170	1.441	.0002830	0.03323
2130.00	4.6948	1.441	.0002670	0.03325
2140.00	4.6729	1.441	.0003380	0.03326
2150.00	4.6512	1.441	.0004270	0.03327
2160.00	4.6296	1.441	.0004510	0.03327
2170.00	4.6083	1.441	.0003960	0.03328
2180.00	4.5872	1.442	.0003940	0.03329
2190.00	4.5662	1.442	.0004050	0.03330
2200.00	4.5455	1.442	.0004420	0.03331
2210.00	4.5249	1.442	.0005260	0.03332
2220.00	4.5045	1.442	.0006470	0.03332
2230.00	4.4843	1.442	.0006640	0.03331
2240.00	4.4643	1.442	.0005750	0.03331
2250.00	4.4444	1.442	.0004870	0.03331
2260.00	4.4248	1.442	.0003740	0.03332
2270.00	4.4053	1.442	.0002940	0.03334
2280.00	4.3860	1.442	.0002840	0.03336
2290.00	4.3668	1.442	.0002730	0.03337
2300.00	4.3478	1.442	.0002460	0.03338
2310.00	4.3290	1.442	.0002320	0.03340
2320.00	4.3103	1.443	.0002560	0.03342
2330.00	4.2918	1.443	.0003390	0.03344
2340.00	4.2735	1.443	.0004390	0.03344
2350.00	4.2553	1.443	.0004240	0.03344
2360.00	4.2373	1.443	.0003230	0.03345
2370.00	4.2194	1.443	.0003000	0.03347
2380.00	4.2017	1.443	.0003570	0.03349
2390.00	4.1841	1.443	.0004410	0.03350
2400.00	4.1667	1.443	.0005290	0.03351
2410.00	4.1494	1.443	.0007190	0.03351
2420.00	4.1322	1.443	.0006540	0.03349
2430.00	4.1152	1.443	.0004450	0.03350
2440.00	4.0984	1.443	.0004190	0.03353
2450.00	4.0816	1.444	.0004530	0.03354
2460.00	4.0650	1.444	.0004630	0.03355
2470.00	4.0486	1.444	.0004750	0.03356
2480.00	4.0323	1.444	.0004340	0.03357
2490.00	4.0161	1.444	.0003960	0.03359
2500.00	4.0000	1.444	.0003850	0.03360

Table 28. Diethyl-sulfite (DES).

PAGE 5

WN	WL	N	K	R
2510.00	3.9841	1.444	.0003730	0.03362
2520.00	3.9683	1.444	.0003560	0.03363
2530.00	3.9526	1.444	.0003030	0.03365
2540.00	3.9370	1.445	.0002620	0.03367
2550.00	3.9216	1.445	.0002570	0.03369
2560.00	3.9063	1.445	.0002520	0.03372
2570.00	3.8911	1.445	.0002340	0.03374
2580.00	3.8760	1.445	.0002330	0.03377
2590.00	3.8610	1.446	.0002540	0.03379
2600.00	3.8462	1.446	.0002750	0.03382
2610.00	3.8314	1.446	.0002760	0.03385
2620.00	3.8168	1.446	.0002800	0.03388
2630.00	3.8023	1.447	.0003060	0.03391
2640.00	3.7879	1.447	.0003460	0.03395
2650.00	3.7736	1.447	.0004070	0.03399
2660.00	3.7594	1.448	.0004980	0.03403
2670.00	3.7453	1.448	.0006400	0.03408
2680.00	3.7313	1.448	.0008790	0.03412
2690.00	3.7175	1.448	.0010630	0.03414
2700.00	3.7037	1.449	.0010970	0.03417
2710.00	3.6900	1.449	.0011620	0.03422
2720.00	3.6765	1.449	.0014550	0.03426
2730.00	3.6630	1.449	.0015360	0.03426
2740.00	3.6496	1.450	.0010870	0.03431
2750.00	3.6364	1.451	.0008470	0.03441
2760.00	3.6232	1.452	.0008270	0.03453
2770.00	3.6101	1.453	.0009180	0.03465
2780.00	3.5971	1.454	.0011000	0.03480
2790.00	3.5842	1.455	.0013920	0.03497
2800.00	3.5714	1.457	.0018490	0.03517
2810.00	3.5587	1.459	.0027090	0.03543
2820.00	3.5461	1.461	.0044050	0.03572
2830.00	3.5336	1.463	.0068600	0.03598
2840.00	3.5211	1.465	.0100150	0.03625
2850.00	3.5088	1.466	.0150300	0.03644
2860.00	3.4965	1.465	.0212510	0.03635
2870.00	3.4843	1.459	.0264840	0.03563
2880.00	3.4722	1.454	.0222750	0.03495
2890.00	3.4602	1.458	.0195440	0.03546
2900.00	3.4483	1.464	.0244700	0.03619
2910.00	3.4364	1.465	.0350820	0.03646
2920.00	3.4247	1.458	.0498260	0.03571
2930.00	3.4130	1.438	.0500450	0.03322
2940.00	3.4014	1.433	.0345340	0.03247
2950.00	3.3898	1.443	.0352530	0.03365
2960.00	3.3784	1.440	.0552870	0.03366
2970.00	3.3670	1.409	.0602020	0.02994
2980.00	3.3557	1.393	.0315250	0.02770
2990.00	3.3445	1.400	.0147670	0.02837
3000.00	3.3333	1.408	.0074600	0.02922

Table 28. Diethyl-sulfite (DES).

PAGE 6

WN	WL	N	K	R
3010.00	3.3223	1.414	.0041230	0.02994
3020.00	3.3113	1.418	.0030250	0.03045
3030.00	3.3003	1.421	.0024410	0.03079
3040.00	3.2895	1.423	.0019860	0.03105
3050.00	3.2787	1.425	.0016670	0.03126
3060.00	3.2680	1.426	.0014710	0.03143
3070.00	3.2573	1.427	.0013200	0.03156
3080.00	3.2468	1.428	.0011700	0.03168
3090.00	3.2362	1.429	.0010430	0.03178
3100.00	3.2258	1.430	.0009220	0.03187
3110.00	3.2154	1.431	.0008360	0.03195
3120.00	3.2051	1.431	.0007880	0.03203
3130.00	3.1949	1.432	.0007760	0.03210
3140.00	3.1847	1.432	.0007850	0.03215
3150.00	3.1746	1.433	.0007960	0.03220
3160.00	3.1646	1.433	.0007860	0.03224
3170.00	3.1546	1.433	.0007650	0.03228
3180.00	3.1447	1.433	.0007530	0.03231
3190.00	3.1348	1.434	.0007450	0.03234
3200.00	3.1250	1.434	.0007150	0.03237
3210.00	3.1153	1.434	.0006480	0.03239
3220.00	3.1056	1.434	.0005620	0.03242
3230.00	3.0960	1.435	.0004800	0.03244
3240.00	3.0864	1.435	.0004140	0.03247
3250.00	3.0769	1.435	.0003750	0.03250
3260.00	3.0675	1.435	.0003680	0.03253
3270.00	3.0581	1.435	.0003630	0.03255
3280.00	3.0488	1.436	.0003350	0.03257
3290.00	3.0395	1.436	.0003220	0.03259
3300.00	3.0303	1.436	.0003340	0.03261
3310.00	3.0211	1.436	.0003300	0.03262
3320.00	3.0120	1.436	.0003030	0.03264
3330.00	3.0030	1.436	.0002840	0.03265
3340.00	2.9940	1.436	.0002680	0.03267
3350.00	2.9851	1.436	.0002390	0.03268
3360.00	2.9762	1.437	.0001960	0.03269
3370.00	2.9674	1.437	.0001670	0.03271
3380.00	2.9586	1.437	.0001550	0.03272
3390.00	2.9499	1.437	.0001440	0.03274
3400.00	2.9412	1.437	.0001340	0.03275
3410.00	2.9326	1.437	.0001330	0.03276
3420.00	2.9240	1.437	.0001420	0.03278
3430.00	2.9155	1.437	.0001520	0.03279
3440.00	2.9070	1.438	.0001580	0.03280
3450.00	2.8986	1.438	.0001610	0.03281
3460.00	2.8902	1.438	.0001670	0.03282
3470.00	2.8818	1.438	.0001750	0.03283
3480.00	2.8736	1.438	.0001800	0.03284
3490.00	2.8653	1.438	.0001880	0.03285
3500.00	2.8571	1.438	.0002010	0.03286

Table 28. Diethyl-sulfite (DES).

PAGE 7

WN	WL	N	K	R
3510.00	2.8490	1.438	.0002150	0.03286
3520.00	2.8409	1.438	.0002170	0.03287
3530.00	2.8329	1.438	.0002090	0.03288
3540.00	2.8249	1.438	.0002100	0.03288
3550.00	2.8169	1.438	.0002190	0.03289
3560.00	2.8090	1.438	.0002230	0.03290
3570.00	2.8011	1.438	.0002210	0.03290
3580.00	2.7933	1.438	.0002190	0.03291
3590.00	2.7855	1.439	.0002250	0.03292
3600.00	2.7778	1.439	.0002390	0.03292
3610.00	2.7701	1.439	.0002560	0.03293
3620.00	2.7624	1.439	.0002630	0.03293
3630.00	2.7548	1.439	.0002570	0.03293
3640.00	2.7473	1.439	.0002490	0.03294
3650.00	2.7397	1.439	.0002470	0.03294
3660.00	2.7322	1.439	.0002470	0.03295
3670.00	2.7248	1.439	.0002440	0.03295
3680.00	2.7174	1.439	.0002430	0.03296
3690.00	2.7100	1.439	.0002460	0.03296
3700.00	2.7027	1.439	.0002410	0.03296
3710.00	2.6954	1.439	.0002320	0.03297
3720.00	2.6882	1.439	.0002220	0.03297
3730.00	2.6810	1.439	.0002090	0.03297
3740.00	2.6738	1.439	.0001960	0.03298
3750.00	2.6667	1.439	.0001800	0.03298
3760.00	2.6596	1.439	.0001560	0.03299
3770.00	2.6525	1.439	.0001330	0.03299
3780.00	2.6455	1.439	.0001200	0.03300
3790.00	2.6385	1.439	.0001090	0.03300
3800.00	2.6316	1.439	.0000980	0.03301
3810.00	2.6247	1.439	.0000970	0.03302
3820.00	2.6178	1.439	.0001140	0.03302
3830.00	2.6110	1.439	.0001350	0.03303
3840.00	2.6042	1.439	.0001500	0.03303
3850.00	2.5974	1.440	.0001520	0.03304
3860.00	2.5907	1.440	.0001570	0.03304
3870.00	2.5840	1.440	.0001770	0.03305
3880.00	2.5773	1.440	.0002070	0.03305
3890.00	2.5707	1.440	.0002400	0.03306
3900.00	2.5641	1.440	.0002730	0.03306
3910.00	2.5575	1.440	.0002980	0.03306
3920.00	2.5510	1.440	.0003110	0.03306
3930.00	2.5445	1.440	.0003250	0.03306
3940.00	2.5381	1.440	.0003480	0.03307
3950.00	2.5316	1.440	.0003740	0.03307
3960.00	2.5253	1.440	.0003940	0.03307
3970.00	2.5189	1.440	.0003890	0.03306
3980.00	2.5126	1.440	.0003700	0.03307
3990.00	2.5063	1.440	.0003710	0.03307
4000.00	2.5000	1.440	.0003840	0.03307



WN	WL	N	K	R
4016.06	2.4900	1.440	.0003470	0.03307
4032.26	2.4800	1.440	.0002850	0.03307
4048.58	2.4700	1.440	.0002950	0.03308
4065.04	2.4600	1.440	.0003370	0.03308
4081.63	2.4500	1.440	.0002710	0.03308
4098.36	2.4400	1.440	.0002470	0.03310
4115.23	2.4300	1.440	.0002820	0.03311
4132.23	2.4200	1.440	.0003170	0.03312
4149.38	2.4100	1.440	.0004200	0.03313
4166.67	2.4000	1.440	.0005380	0.03312
4184.10	2.3900	1.440	.0005470	0.03312
4201.68	2.3800	1.440	.0006650	0.03313
4219.41	2.3700	1.440	.0007700	0.03311
4237.29	2.3600	1.440	.0006840	0.03309
4255.32	2.3500	1.440	.0005550	0.03309
4273.50	2.3400	1.440	.0004020	0.03310
4291.85	2.3300	1.440	.0004630	0.03313
4310.34	2.3200	1.440	.0006860	0.03314
4329.00	2.3100	1.440	.0009750	0.03313
4347.83	2.3000	1.440	.0011280	0.03309
4366.81	2.2900	1.440	.0008930	0.03306
4385.96	2.2800	1.440	.0007800	0.03306
4405.29	2.2700	1.440	.0007510	0.03304
4424.78	2.2600	1.439	.0004310	0.03302
4444.44	2.2500	1.440	.0001890	0.03304
4464.29	2.2400	1.440	.0001230	0.03306
4484.31	2.2300	1.440	.0000970	0.03308
4504.50	2.2200	1.440	.0000830	0.03308
4524.89	2.2100	1.440	.0000690	0.03309
4545.45	2.2000	1.440	.0000550	0.03310
4566.21	2.1900	1.440	.0000490	0.03311
4587.16	2.1800	1.440	.0000470	0.03311
4608.29	2.1700	1.440	.0000420	0.03312
4629.63	2.1600	1.440	.0000390	0.03312
4651.16	2.1500	1.440	.0000370	0.03312
4672.90	2.1400	1.440	.0000340	0.03313
4694.84	2.1300	1.440	.0000310	0.03313
4716.98	2.1200	1.440	.0000310	0.03314
4739.34	2.1100	1.440	.0000300	0.03314
4761.90	2.1000	1.440	.0000260	0.03314
4784.69	2.0900	1.440	.0000230	0.03315
4807.69	2.0800	1.440	.0000210	0.03315
4830.92	2.0700	1.440	.0000210	0.03315
4854.37	2.0600	1.440	.0000240	0.03316
4878.08	2.0500	1.441	.0000280	0.03316
4901.96	2.0400	1.441	.0000320	0.03316
4926.11	2.0300	1.441	.0000360	0.03317
4950.50	2.0200	1.441	.0000360	0.03317
4975.12	2.0100	1.441	.0000350	0.03317
5000.00	2.0000	1.441	.0000300	0.03317

Table 28. Diethyl-sulfite (DES).

PAGE 9

WN	WL	N	K	R
5025.13	1.9900	1.441	.0000270	0.03317
5050.50	1.9800	1.441	.0000210	0.03318
5076.14	1.9700	1.441	.0000200	0.03318
5102.04	1.9600	1.441	.0000200	0.03318
5128.21	1.9500	1.441	.0000230	0.03319
5154.64	1.9400	1.441	.0000260	0.03319
5181.35	1.9300	1.441	.0000300	0.03319
5208.33	1.9200	1.441	.0000330	0.03319
5235.60	1.9100	1.441	.0000290	0.03319
5263.16	1.9000	1.441	.0000260	0.03320
5291.01	1.8900	1.441	.0000220	0.03320
5319.15	1.8800	1.441	.0000200	0.03320
5347.59	1.8700	1.441	.0000230	0.03321
5376.34	1.8600	1.441	.0000340	0.03321
5405.41	1.8500	1.441	.0000420	0.03321
5434.78	1.8400	1.441	.0000400	0.03321
5464.48	1.8300	1.441	.0000300	0.03321
5494.51	1.8200	1.441	.0000220	0.03321
5524.86	1.8100	1.441	.0000180	0.03322
5555.56	1.8000	1.441	.0000240	0.03322
5586.59	1.7900	1.441	.0000350	0.03323
5617.98	1.7800	1.441	.0000490	0.03323
5649.72	1.7700	1.441	.0000900	0.03323
5681.82	1.7600	1.441	.0001790	0.03324
5714.29	1.7500	1.441	.0002480	0.03323
5747.13	1.7400	1.441	.0001760	0.03322
5780.35	1.7300	1.441	.0001460	0.03322
5813.95	1.7200	1.441	.0001070	0.03322
5847.95	1.7100	1.441	.0001140	0.03323
5882.35	1.7000	1.441	.0001600	0.03322
5917.16	1.6900	1.441	.0001210	0.03322
5952.38	1.6800	1.441	.0000500	0.03322
5988.02	1.6700	1.441	.0000170	0.03322
6024.10	1.6600	1.441	.0000110	0.03323
6060.61	1.6500	1.441	.0000090	0.03323
6097.56	1.6400	1.441	.0000080	0.03323
6134.97	1.6300	1.441	.0000070	0.03323
6172.84	1.6200	1.441	.0000060	0.03324
6211.18	1.6100	1.441	.0000040	0.03324
6250.00	1.6000	1.441	.0000030	0.03324
6289.31	1.5900	1.441	.0000030	0.03324
6329.11	1.5800	1.441	.0000020	0.03325
6369.43	1.5700	1.441	.0000030	0.03325
6410.26	1.5600	1.441	.0000030	0.03325
6451.61	1.5500	1.441	.0000030	0.03325
6493.51	1.5400	1.441	.0000030	0.03325
6535.95	1.5300	1.441	.0000030	0.03325
6578.95	1.5200	1.441	.0000030	0.03325
6622.52	1.5100	1.441	.0000040	0.03326
6666.67	1.5000	1.441	.0000040	0.03326

Table 28. Diethyl-sulfite (DES).

PAGE 10

WN	WL	N	X	R
6711.41	1.4900	1.441	.0000060	0.03326
6756.76	1.4800	1.441	.0000060	0.03326
6802.72	1.4700	1.441	.0000070	0.03326
6849.31	1.4600	1.441	.0000060	0.03326
6896.55	1.4500	1.441	.0000070	0.03327
6944.44	1.4400	1.441	.0000090	0.03327
6993.01	1.4300	1.441	.0000110	0.03327
7042.25	1.4200	1.441	.0000110	0.03327
7092.20	1.4100	1.441	.0000150	0.03327
7142.86	1.4000	1.441	.0000150	0.03327
7194.24	1.3900	1.441	.0000180	0.03327
7246.38	1.3800	1.441	.0000150	0.03327
7299.27	1.3700	1.441	.0000110	0.03327
7352.94	1.3600	1.441	.0000080	0.03327
7407.41	1.3500	1.441	.0000040	0.03328
7462.69	1.3400	1.441	.0000020	0.03328
7518.80	1.3300	1.441	.0000020	0.03328
7575.76	1.3200	1.441	.0000010	0.03328
7633.59	1.3100	1.441	.0000020	0.03328
7692.31	1.3000	1.441	.0000020	0.03326
7751.94	1.2900	1.442	.0000020	0.03328
7812.50	1.2800	1.442	.0000020	0.03329
7874.02	1.2700	1.442	.0000020	0.03329
7936.51	1.2600	1.442	.0000020	0.03329
8000.00	1.2500	1.442	.0000020	0.03329
8064.52	1.2400	1.442	.0000020	0.03329
8130.08	1.2300	1.442	.0000030	0.03329
8196.72	1.2200	1.442	.0000050	0.03329
8264.46	1.2100	1.442	.0000070	0.03329
8333.33	1.2000	1.442	.0000150	0.03330
8403.36	1.1900	1.442	.0000270	0.03329
8474.58	1.1800	1.442	.0000170	0.03329
8547.01	1.1700	1.442	.0000090	0.03330
8620.69	1.1600	1.442	.0000060	0.03330
8695.65	1.1500	1.442	.0000060	0.03330
8771.93	1.1400	1.442	.0000040	0.03330
8849.56	1.1300	1.442	.0000020	0.03330
8928.57	1.1200	1.442	.0000010	0.03330
9009.01	1.1100	1.442	.0000010	0.03330
9090.91	1.1000	1.442	.0000010	0.03330
9174.31	1.0900	1.442	.0000010	0.03330
9259.26	1.0800	1.442	.0000010	0.03331
9345.79	1.0700	1.442	.0000010	0.03331
9433.96	1.0600	1.442	.0000010	0.03331
9523.81	1.0500	1.442	.0000010	0.03331
9615.38	1.0400	1.442	.0000010	0.03331
9708.74	1.0300	1.442	.0000010	0.03331
9803.92	1.0200	1.442	.0000010	0.03331
9900.99	1.0100	1.442	.0000010	0.03331
10000.00	1.0000	1.442	.0000010	0.03331

Table 28. Diethyl-sulfite (DES).

PAGE 11

WN	WL	N	K	R
10101.00	0.9900	1.442	.00000010	0.03331
10204.10	0.9800	1.442	.00000010	0.03331
10309.30	0.9700	1.442	.00000010	0.03332
10416.70	0.9600	1.442	.00000010	0.03332
10526.30	0.9500	1.442	.00000010	0.03332
10638.30	0.9400	1.442	.00000010	0.03332
10752.70	0.9300	1.442	.00000010	0.03332
10869.60	0.9200	1.442	.00000020	0.03332
10989.00	0.9100	1.442	.00000020	0.03332
11111.10	0.9000	1.442	.00000020	0.03332
11236.00	0.8900	1.442	.00000010	0.03332
11363.60	0.8800	1.442	.00000010	0.03332
11494.30	0.8700	1.442	.00000010	0.03332
11627.90	0.8600	1.442	.00000010	0.03333
11764.70	0.8500	1.442	.00000010	0.03333
11904.80	0.8400	1.442	.00000010	0.03333
12048.20	0.8300	1.442	.00000010	0.03333
12195.10	0.8200	1.442	.00000010	0.03333
12345.70	0.8100	1.442	.00000010	0.03333
12500.00	0.8000	1.442	.00000000	0.03333
12658.20	0.7900	1.442	.00000000	0.03333
12820.50	0.7800	1.442	.00000000	0.03333
12987.00	0.7700	1.442	.00000000	0.03333
13157.90	0.7600	1.442	.00000000	0.03334
13333.30	0.7500	1.442	.00000000	0.03334
13513.50	0.7400	1.442	.00000010	0.03334
13698.60	0.7300	1.442	.00000010	0.03334
13888.90	0.7200	1.442	.00000010	0.03334
14084.50	0.7100	1.442	.00000010	0.03334
14285.70	0.7000	1.442	.00000010	0.03334
14492.80	0.6900	1.442	.00000010	0.03334
14705.90	0.6800	1.442	.00000010	0.03334
14925.40	0.6700	1.442	.00000010	0.03334
15151.50	0.6600	1.442	.00000010	0.03334
15384.60	0.6500	1.442	.00000010	0.03334
15625.00	0.6400	1.442	.00000010	0.03335
15873.00	0.6300	1.442	.00000010	0.03335
16129.00	0.6200	1.442	.00000010	0.03335
16393.40	0.6100	1.442	.00000010	0.03335
16666.70	0.6000	1.442	.00000010	0.03335
16949.20	0.5900	1.442	.00000010	0.03335
17241.40	0.5800	1.442	.00000010	0.03335
17543.90	0.5700	1.442	.00000010	0.03335
17857.10	0.5600	1.442	.00000010	0.03335
18181.80	0.5500	1.442	.00000010	0.03336
18518.50	0.5400	1.442	.00000010	0.03336
18867.90	0.5300	1.442	.00000010	0.03336
19230.80	0.5200	1.442	.00000010	0.03336
19607.80	0.5100	1.442	.00000010	0.03336
20000.00	0.5000	1.442	.00000010	0.03336

Table 28. Diethyl-sulfite (DES).

PAGE 12

WN	WL	N	K	R
20408.20	0.4900	1.442	.0000010	0.03336
20833.30	0.4800	1.442	.0000010	0.03336
21276.60	0.4700	1.442	.0000010	0.03336
21739.10	0.4600	1.442	.0000010	0.03336
22222.20	0.4500	1.442	.0000010	0.03337
22727.30	0.4400	1.442	.0000010	0.03337
23255.80	0.4300	1.442	.0000010	0.03337
23809.50	0.4200	1.442	.0000010	0.03337
24390.20	0.4100	1.442	.0000010	0.03337
25000.00	0.4000	1.442	.0000020	0.03337
25641.00	0.3900	1.442	.0000020	0.03337
26315.80	0.3800	1.442	.0000020	0.03337
27027.00	0.3700	1.442	.0000020	0.03338
27777.80	0.3600	1.442	.0000030	0.03338
28571.40	0.3500	1.442	.0000030	0.03338
29411.80	0.3400	1.442	.0000040	0.03338
30303.00	0.3300	1.442	.0000060	0.03338
31250.00	0.3200	1.442	.0000080	0.03339
32258.10	0.3100	1.442	.0000110	0.03339
33333.30	0.3000	1.442	.0000170	0.03339
34482.80	0.2900	1.442	.0000460	0.03340
35714.30	0.2800	1.442	.0000930	0.03340
37037.00	0.2700	1.442	.0001380	0.03340

Blank

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